Annual Report

2016

Celebrating 30 years of life-saving research

Heart Research Australia

CONTENTS

Who we are

05 About Heart Research Australia
06 Our Story
08 Celebrating 30 Years of Innovative Heart Research
10 A Message from the Chairman
12 A Message from the CEO

Heartfelt Fundraising

14 Community Champions
18 Why Support Medical Research?
20 REDFEB 2016
24 Community Events
26 Our Corporate Supporters

Research Update

28 A Message from Chair of Cardiology
30 Research Project Update
40 Salary Support

Governance

42 Financials
44 Our Governance
46 Honours Board

08 Celebrating 30 years of Heart Research

16 Survivor Story

20 REDFEB 2016

30 Research Projects Update

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fia ORGANISATIONAL MEMBER
Professional Fundraising
Excellence in fundraising practice

ABOUT HEART RESEARCH AUSTRALIA

Heart Research Australia is dedicated to funding first-stage, innovative research into the prevention, diagnosis and treatment of heart disease. Because this kind of first-stage research does not attract government funding, our work is powered by the generosity of our supporters.

Our Vision
Making breakthroughs in heart disease happen.

Our Mission
We support 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.

Heart disease remains the biggest killer of Australians, affecting two out of three families, and is responsible for claiming the lives of four times as many women as breast cancer each year.

With the increasing rate of diabetes and obesity in the community, it is predicted that deaths from heart disease will rise further still, making the need for medical breakthroughs even more urgent.

Join our fight against heart disease.

Our research is powered by your support. Your donations and fundraising contribute towards reducing the devastating impact heart disease has on families and communities, as well as helping to protect future generations.

Here are just some of the ways you can show your support:

- Make a donation, or better still, become a regular donor
- Participate in our fundraising campaigns
- Do your own fundraising
- Purchase a raffle ticket
- Leave a gift in your Will.

For further information visit www.heartresearch.com.au or call 02 9436 0056.

OUR STORY

In the early 1980s a group of Royal North Shore Hospital cardiologists (Dr Gaston Bauer AM, Dr John Gunning AM and Professor Stephen Hunyor) recognised the growing need for a Foundation to be established to support first-stage research aimed at reducing the alarmingly high death rates due to heart disease.

Together with lawyer John Holman, cardiac patient the late John Marks, and a $25,000 donation from National Australia Bank, they established the North Shore Heart Research Foundation in 1986, to help raise funds to support, 'out of the notebook' research that may never progress to clinical trials.

Thirty years on, this vision has been realised and represents a milestone for the Australian community – the financial support from Heart Research Australia has contributed to world leading standards in cardiac care; to cutting-edge and out-of-the-box thinking in the management of heart disease; and attracting clinicians and researchers from around the world to the cardiology department at Royal North Shore Hospital today.

In 2012, the North Shore Heart Research Foundation went national and became Heart Research Australia.

And all this would not have been possible without Heart Research Australia's growing family of supporters who have continued to give so generously over the years, and those who have looked ahead to the future of Heart Research Australia by leaving a bequest in their Will to help our researchers fight heart disease.

Thank you for supporting Heart Research Australia's quest to keep Australian families together for longer, by investing in research that will reduce the devastating impact heart disease has on Australian families.

◁
The three founding members of Heart Research Australia.

(Top) Dr Gaston Bauer AM, (Middle) Dr John Gunning AM and (Bottom) Professor Stephen Hunyor.

"Heart Research Australia is testament to the vigour and relevance with which individual and industry support has transformed a person and patient-centred benevolent Foundation into a national icon.

This has served to relieve suffering and enhance good, productive years for patients while building on the foundation stone with training of doctoral (PhD) students and equipping world leading facilities for research."

Prof Stephen Hunyor

Heart Research Australia Supports:

Seed Funding

Heart Research Australia provides seed funding for researchers to test innovative ideas, before seeking larger, competitive grants from government funding bodies.

PhD Students

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

'Bench to Bedside'

All funded senior researchers are practising clinical cardiologists, which puts them in the best position to identify research opportunities and immediately 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.

Evidence of How Our Funded Research Saves Lives

An outstanding example of the long-term benefits created through Heart Research Australia funded research is the ETAMI (Early Triage of Acute Myocardial Infarction) procedure for heart attack victims. ETAMI allows patients to be assessed and triaged in the ambulance, using ECG diagnosis transmitted via mobile phone technology. ETAMI saves significant time (up to 100 mins) from incident to treatment and saves heart muscle from irreversible damage by opening up the coronary artery earlier. The program has dramatically cut heart-attack mortality rates from 30% to 2% at Royal North Shore Hospital and is now used as a model of best-practice around Australia.

Advances in Research and Treatment

Heart Research Australia funds a range of different cutting-edge research areas – prevention strategies, diagnosis methodologies and technology, and treatment types. In the 1960s, the death rate from heart disease peaked – causing over 50% of deaths in Australia. Thanks to the increasing advances in heart research and treatment, this rate has steadily declined to its present rate of 33%. But there is still much to do. Heart disease still remains the leading cause of death worldwide – far more than any other disease and the rising levels of obesity and diabetes in adults and children makes the need for breakthroughs even more pressing.

Chairs of Cardiology

We also fund two academic chairs of cardiology in association with the University of Sydney, as well as specialist support staff for these positions: the Chair of Cardiology held by Professor Helge Rasmussen and the Chair of Preventative Cardiology held by Professor Geoffrey Tofler.

By virtue of their position at the Royal North Shore Hospital, one of Sydney's foremost teaching hospitals, our Chairs supervise some of our most promising postgraduate students and Early Career researchers. As mentors for future generations of heart researchers they are building a mighty base of faculty talent which enriches the hospital and in turn attracts a world-class team of high quality investigators all focused on one thing: beating cardiovascular disease.

CELEBRATING 30 YEARS OF INNOVATIVE HEART RESEARCH

1986

North Shore Heart Research Foundation is established with a mission to give heart to future generations.

First coronary heart stent is implanted.

1988

A catheter lab (where heart attacks are treated) is opened at Royal North Shore Hospital (RNSH).

1991

A heart research centre is set up at RNSH, a first for the hospital, with research laboratories, specialist staff, and much other needed research facilities.

2000s

Our research results in improvements in heart function in pre-term babies preventing disability.

2000s

Research funded by the Foundation sees some remarkable results, including seeing the death rate of heart attacks reduce further to 2% – setting a new international standard in cardiac care.

2004

Findings from Professor Helge Rasmussen's research in heart failure are patented.

2011

The North Shore Heart Research Foundation Advanced Cardiovascular Imaging Fellow was established – resulting in young researchers learning state-of-art techniques and contributing to major developments in application and interpretation of MRI to patients with heart disease.

2012

The North Shore Heart Research Foundation rebranded and changed its name to Heart Research Australia to nationalise.

2014

Our researchers identify a new biomarker that reflects 'oxidative stress' is proving promising at detecting early cardiovascular disease in its early stages.

2015

Our researchers identified a new therapeutic strategy to prevent adverse changes in the heart muscle after heart attack, which they are now working to translate to patients.

2016

Heart Research Australia researchers at Royal North Shore and the Kolling Institute leveraged >$750,000pa of external competitive funding for salaries, equipment and project costs

2016

Our cardiologists identify a substantial increase in patients suffering heart attack that have no traditional risk factors (increasing from ~13% to 29% over a decade), and launch a new program of research to address mechanisms and new therapeutic approaches.

"Looking towards the next 30 years, we hope to increase our funding support of ground-breaking research and raise greater awareness of this largely preventable disease."

Mr Tony Crawford
Chairman

A MESSAGE FROM THE CHAIRMAN

2016 marks the 30th Anniversary of Heart Research Australia. As we reflect on our accomplishments of 2015-2016 in this report, it's also important to glance back and see how far Heart Research Australia has come over the past 30 years.

In 1986 a team of cardiologists had the vision of starting a Foundation that would support first-stage research to reduce the alarmingly high mortality rates from heart disease. Thirty years later, this vision now represents an organisation that has significantly contributed to reducing heart attack deaths at Royal North Shore Hospital from a staggering 30% to 2%, through ground breaking initiatives which have included the introduction of stent technology and the pioneering of back to base ECG machines in ambulances.

Since our inception, we have proudly invested over $29 million in heart research. Our funding has expanded from research projects to also include PhD scholarships, two academic Chairs of Cardiology in association with the University of Sydney, specialist and support staff, and research equipment.

What makes Heart Research Australia unique is that we are based at Royal North Shore Hospital, where our researchers, most of them practising cardiologists, are able to translate their knowledge from the 'research bench' to patients 'at the bedside' through their daily interactions with patients, which often results in identifying new innovative research ideas of how to treat, prevent or diagnose heart disease. These 'ideas' might never progress to research and into clinical trials without the help of our wonderful supporters.

A great example of this bench to bedside research trigger is the recent finding that heart patients at Royal North Shore Hospital are presenting more often now with only one or no risk factors for heart disease. This new finding is now being investigated by Heart Research Australia supported researchers to investigate why seemingly healthy people are suffering from heart disease.

While we have achieved so much, there is still much more to be done. Looking towards the next 30 years, we hope to increase our funding support of this ground-breaking research and raise greater awareness of this largely preventable disease through community awareness programs.

△
Chairman Tony Crawford (left), with Dr Anthony Dona and Mr Dominic May at the Annual Heart Health Lunch.

> *"What makes Heart Research Australia unique is that our researchers are able to translate their knowledge from the 'research bench' to patients 'at the bedside' through which often resulting in new research ideas."*

I would like to take this opportunity to thank the Board and the Heart Research Australia's staff over the past 30 years. This year longstanding Board Member, Prof Stephen Hunyor retired from our Board, as will Mr Paul Allison who will retire at our AGM after more than a decade of service. On behalf of us all, I would like to thank Stephen and Paul for their considerable service to the organisation. During the year we also welcomed Mr Charlie Frew to the Board. Charlie brings with him a wealth of knowledge of the not-for-profit sector and we look forward to drawing on his experience on the Board in the years to come.

And finally, I would like to give special recognition to the researchers, cardiologists, PhD students and staff at Royal North Shore Hospital and the Kolling Institute, who've all made a significant contribution in supporting the Heart Research Australia's quest to keep Australian families together for longer.

Tony Crawford

Tony Crawford
Chairman

The story of life-saving research

1902 - 1903
Royal North Shore Hospital (RNSH) opens at its current site in St Leonards. (Before this it was in a cottage in Crows Nest).

1939
A new era of heart surgery begins with a treatment for children born with a 'hole in the heart'.

1948
RNSH officially becomes a teaching hospital of the University of Sydney.

1950s
The need for effective treatment of heart disease is recognised as death rates are rising. Health surveys are instigated to pinpoint causes and risk factors.

1953
A cardiac investigation clinic is formed at RNSH.

A MESSAGE FROM THE CEO

Thanks to your support, we are celebrating 30 years of funding first-stage innovative heart research

Dear Friend,

It is with great pleasure that I write my first annual report as Chief Executive Officer of Heart Research Australia. I am honoured to lead an organisation that plays such a significant role in reducing the devastating impact heart disease has on families and communities.

Having worked in the medical charity space for many years, I have a good understanding of the challenges we as an organisation face to secure funding for the inspiring researchers we support in their quest to find new innovative ways of preventing, diagnosing and treating heart disease.

As you will read in this report, Heart Research Australia is driven by people like you — our donors, volunteers, sponsors, researchers and heart patients. Your support, commitment and passion enables us to continue our investment in ground-breaking research, and lead prevention efforts through innovative community programs.

Thanks to your support, we are celebrating 30 years of funding first-stage innovative heart research, supporting young PhD students in their quests to become future research leaders, two Chairs of Cardiology and recognising our wonderful community of supporters whose generous financial support powers our existence.

I would like to thank the dedicated ladies of the Red & White Committee, who have coordinated the Heart Health lunch at the Dedes Group's Deckhouse Restaurant with such passion over the last 11 years and raised crucial funds for us. The annual Red Heart Rugby Day, with thanks to our partnership with Northern Suburbs Rugby Club, is also a firm favourite on our fundraising calendar, where the players proudly wear their heart-branded socks and help us raise much needed funds towards our research projects. We salute and thank them for their continued support.

Your donations have contributed to many life-changing research projects over the last 30 years. It is thanks to a trial funded by Heart Research Australia that ECG machines are now common practice in all ambulances, offering a patient assessment to be sent to the hospital before the patient arrives, reducing mortality rates from 8% - 2%.

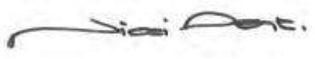
Back in 1997 the standard treatment for opening arteries was the use of slow-acting, clot-busting drugs. These took time to work, and could cause serious complications. Heart Research Australia funded researchers Professor Helge Rasmussen and Dr Gregory Nelson, both interventionist cardiologists at Royal North Shore Hospital, believed that using stents to unblock arteries was likely to be a superior, and faster, treatment. The use of stents proved a much safer and more effective treatment.

As you will read in this report, there are many more ground-breaking projects currently being supported by Heart Research Australia. Projects such as developing a treatment that is showing the potential to help patients with severe heart failure. An estimated 30,000 Australians are diagnosed with heart failure every year, with the chances of surviving for more than five years being worse than many forms of cancer. This drug is currently undergoing human trials in Denmark.

Our research is about giving Australians more time and keeping families together for longer. We know that early onset of heart disease is 80% preventable — yet close to 1.4 million Australians are affected by this disease, with one Australian life being taken every 27 minutes. With your support, we can make significant inroads to change this.

I am delighted to be working alongside such a talented and committed Board of Directors and dedicated staff, and would like to thank them for their support during my transition into the role of CEO.

Much still needs to be done and with your help, I am confident that we can continue to support these inspiring researchers to keep Australians living a longer, healthier life.



Nicci Dent
CEO

The story of life-saving research

1959
Factors found that increase the likelihood of heart disease.*

1960s
Advances are made in the diagnosis and management of heart disease, with specific blood tests, more effective medication, and portable ECG machines becoming more widely available.

1960 - 1961
First open heart surgery performed at RNSH.

The first coronary artery bypass surgery performed.

1967
Cigarette smoking, cholesterol levels and high blood pressure are found to increase the risk of heart disease.*

Physical activity found to reduce the risk of heart disease, and obesity to increase the risk.*

* https://www.framinghamheartstudy.org/about-fhs/research-milestones.php

COMMUNITY CHAMPIONS

Heartbreaking love story

Kate and Olly were the perfect love story. After meeting at a local community Ball, it was love at first sight and not long after meeting they moved in together, with Olly becoming a caring father figure to Kate's daughter.

It was a home filled with love and laughter, and the future looked very bright, with both starting new jobs and enjoying life to the fullest.

Sadly, in late 2014, all their dreams came crashing down, when Olly collapsed onto the floor while they were enjoying a quiet afternoon in their garden shed.

Kate recalls "I called out to him over and over as I dialled 000 and watched Olly convulsing violently on the floor while the dispatch officer talked me through what to do. Two ambulances were there within minutes and after assessing his condition, called for an ICU vehicle to attend as they feared he would die there and then".

As Olly had collapsed falling hard on the ground, doctors assumed he had a concussion and told Kate she could go home and return to collect him the next day. However, when Kate arrived to presumably take Olly home she knew he wasn't well.

"As soon as I saw him, I knew something was seriously wrong. He was yellow to look at and sweating. Within an hour he took a turn for the worse when his oxygen absorption was non-existent and they went to rush him to ICU".

Devastatingly, Olly never made it to ICU. Unbeknown to anyone, Olly had an extremely enlarged heart and had suffered an aortic dissection, which meant that his aorta had torn away from his heart. If it had ruptured through he would have almost certainly died immediately, but it was a partial tear that leaked through into the aorta wall and subsequently, the walls of his heart, which sadly resulted in him passing away.

Olly was a regular supporter of Heart Research Australia, but had never had his heart checked.

Kate says "I know I can't bring him back, but I hope that by raising awareness it might encourage one person to have a heart check that may save a life. I continue to support Heart Research Australia in honour of Olly's memory".

◁ The Late Nick Duncan at the Australian War Memorial.

An incredible tribute

Earlier this year, we were contacted by Thomas Hedger, who was setting up a fundraising page to honour his cousin Nick Duncan, who had died very unexpectedly in February.

Tom was awoken early one Saturday morning to hear that his cousin Nick had suffered a heart attack. Tom recalled "We were originally told that he had been revived and airlifted out of his home in Bendigo to the ICU at the Alfred [Hospital]."

Despite heroic care by paramedics and the ICU team, Nick passed away almost a week after his heart attack.

Nick's death came as a huge shock to everyone close to him, as he seemed to be a healthy young man. He was only 33, heavily involved in the Army Reserve and kept himself fit through jogging regularly. He had also just begun his own IT business in his home town of Bendigo, where his IT talents were well known.

"To leave us at such a young age, impacted myself and the wider family immensely as he was someone that I looked up to all my life, and he was not only my cousin but also a pseudo older brother and close friend. It has made me realise the importance of heart health and why organisations such as Heart Research Australia are so important; to prevent senseless tragedies like this occurring in the future," Tom shared.

In an incredible tribute to Nick, his family, friends and colleagues have raised over $6,000.

We have been very touched by the beautiful tributes, and are immensely grateful for the funds raised for heart research in Nick's honour.

The story of life-saving research

1967
First heart transplant performed.

Late 1960s
Number of Australians dying from heart disease peaks to over 55% of deaths per year.

1970s
The mortality rate for heart attack victims is 33%. Researchers establish that speedy intervention is essential.

Dedicated coronary care centres appear around the world.

Outlook for heart patients start to improve with an array of advancements in the management of heart disease: the introduction of heart ultrasound (echocardiogram), pacemakers, medications such as beta-blocking drugs, and coronary angiography (bypass surgery for narrowed arteries).

SURVIVOR STORY

Earlier this year, Cary, a 63-year-old grandfather of two, was driving home from a client's office when he felt a strange dizziness.

He was feeling so unwell by the time he arrived home, he called his wife to arrange for someone else to collect their granddaughter from school.

Cary's wife called an ambulance which arrived quickly and the ambulance officers conducted an ECG which suggested Cary was having a heart attack. As the ambulance rushed Cary to Royal North Shore Hospital, Cary was experiencing ventricular fibrillation – a short circuiting of the heart. The ambulance officers used a defibrillator to try and shock Cary's heart back to a normal rhythm, but he continued to have recurrent cardiac arrests.

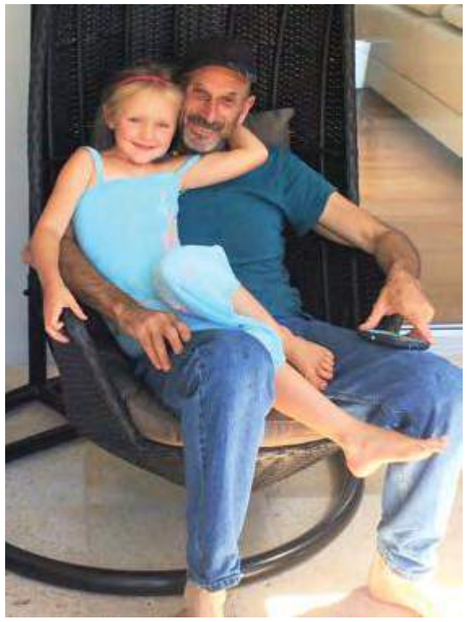
One of our researchers, Dr Ravinay Bhindi, was notified of Cary's condition and impending arrival at the hospital via the ETAMI (Early Triage of Acute Myocardial Infarction) ECG service, and through the data he received, prepared the catheter laboratory.

Dr Bhindi decided to go ahead with the stent insertion procedure on Cary's arrival, despite the fact Cary had first collapsed over 40 minutes ago and his chances of survival were shrinking by the minute. Thankfully, the stent, as well as a special balloon pump, were able to unblock Cary's artery and his heart was shocked back into a normal rhythm.

Cary told us, "I feel a guardian angel has been looking after me. If there had been one hitch along the way, I wouldn't be here."

Cary is incredibly grateful to the amazing ambulance officers and doctors who treated him, but believes he is alive to share his story because he received an ECG in the ambulance, allowing him to bypass triage in the emergency department and go straight to the catheter laboratory for treatment.

Through the generosity of wonderful donors, Heart research Australia helped fund the trial that lead to ECG machines being installed in ambulances in the 1990's. They also helped fund the SALAMI (Stents as an Alternative to Lytic therapy in Acute Myocardial Infarction) study that lead to patients like Cary being treated through the insertion of a stent, rather than being administered slow-acting drugs to unblock their coronary arteries.



△
Cary and his granddaughter Amelia.

"I wouldn't be here if it weren't for the machine in the ambulance funded by Heart Research Australia...My grandkids are the real benefactors of this work as they will have their grandfather around for years to come" says Cary.

Cary says he cannot speak highly enough of the care he received. He was particularly moved when cardiologist Dr Michael Ward came to visit him one evening and said "I've had a really hard day. You are our good news story and we all talk about your remarkable survival. I came to see you for myself to feel good about life."

Cary feels very strongly that he mustn't waste his second chance at life – that he has to be worthy of the precious gift that he has been lucky enough to receive.

Did you know? – Heart Fact:

Your heart can keep beating even if it is separated from the body because it has its own electrical impulse.

75 trillion cells receive blood from the heart. Only the corneas don't.

Your heart will pump nearly 1.5 million barrels of blood during your lifetime, enough to fill 200 train tank cars.

The story of life-saving research

1978
Psychosocial factors found to affect heart disease.*

1980s
Blood-clot dissolving medication introduced.

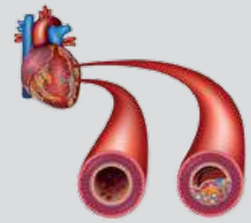
Aspirin identified as a preventative.

Revolutionary cholesterol lowering drugs created.

Education on risk factors becomes a major focus.

First implantable cardioverter defibrillator implant at Royal North Shore Hospital (RNSH) (a small electrical device designed to detect and correct rapid and potentially life threatening heart rhythms, such as ventricular tachycardia).

Surgeons are investigating the use of stents in blocked arteries.



* https://www.framinghamheartstudy.org/about-fhs/research-milestones.php

WHY SUPPORT MEDICAL RESEARCH?

Heart Research Australia is totally reliant on the generosity of our supporters who give time, money and passion to our cause. Whether you donated, included us in your Will, or purchased a raffle ticket – you should feel proud of the ground-breaking research you've helped make possible.

Not only are you funding crucial first-stage research, you are also supporting senior and emerging researchers who are dedicated to finding innovative solutions for the prevention, diagnosis and treatment of heart disease.

Your outstanding support powered a $1.49 million investment in heart research during the 2016 financial year.

You have sustained and enhanced our work in the following ways:

- Providing strategic funding for innovative discovery projects and pilot data for clinical studies.
- Supporting two Heart Research Australia Chairs of Cardiology allowing us to attract internationally renowned clinician researchers to lead research and education and be role models and mentors for future generations of physician/researchers.
- Enhancing the effectiveness of research teams by funding support staff and infrastructure to maximize research discoveries and clinical translation.
- Funding the most talented scientists at all stages of their career working across the whole spectrum of cardiovascular disease, including early career and PhD scholarships.
- Collaborating with leading researchers in Australia and internationally on innovative heart research.
- Engaging with the community by conducting education programs on cardiovascular health and providing quality resources.

To both our long-time supporters, as well as our new donors – we offer you our most sincere, heartfelt thanks. Donations and the purchase of raffle tickets provide our research programs with stability and security, accounting for nearly a quarter of funds raised this year.

Special thanks is owed to our 'Heart Heroes', a group of loyal donors who have kindly committed to make monthly donations to us. Not only does your support fund vital research today, it also gives us confidence in planning for the future.

With heart disease affecting two-thirds of Australian families, many of our supporters have been personally touched by heart disease, and share our desire to spare families from the terrible heartache that this disease causes.

This year, one raffle entrant was surprised to hear she had won second prize and shared that she had suffered a heart attack a few years back and was "brilliantly attended to" at Royal North Shore Hospital. She is exceptionally grateful to the doctors and staff who cared for her, and was delighted to have won a prize while supporting a cause so close to her own heart.

To all our donors, your support, no matter how large or small, contributes to making breakthroughs in heart disease happen – breakthroughs which will impact Australian families both directly and indirectly for years and generations to come. We are humbled by your generosity and compassion.

Thank you.

▽
Professor Helge Rasmussen with one of his research team members analysing data through a microscope.

Giving Heart to Future Generations

In 2016 we were grateful and humbled to receive $1.15 million from individuals who made a powerful commitment to change the future of heart disease by leaving a gift to Heart Research Australia in their Wills.

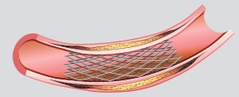
Gifts in Wills, no matter the size or amount, are extremely important to our work. More than a quarter of our research is funded in this way and it enables the kind of long term planning which is essential in medical research where breakthroughs can take years to achieve.

Heart Research Australia relies on the power of individuals giving together to help us win the fight against heart disease. We hope you will consider being a part of tomorrow's discoveries by supporting us in this powerful way. The next treatment for heart disease could start with you and a Gift in your Will.

The story of life-saving research

1986

First coronary heart stent implanted.



North Shore Heart Research Foundation is established with a mission to give heart to future generations.

North Shore Heart Research Foundation

1988

A catheter lab (where heart attacks are treated) is opened at Royal North Shore Hospital (RNSH).

North Shore Cardiovascular Education Centre established to provide cardiac rehabilitation services to RNSH patients. At the time it was only one of a handful of similar services operating in NSW; today it is nationally recognised as the gold standard.

North Shore Cardiovascular Education Centre

FUNDRAISING

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

Supporters from all over the country have shown their support of Heart Research Australia by participating in fundraising events and donating money to help us continue to support our inspirational researchers in their quest to protect and save more Australians from heart disease.

Saving lives and keeping families together for longer is our mission, and we fulfill it by funding those first-stages of research that lead the way to clinical trials. We also take great care to invest wisely in everything we do because we consider ourselves caretakers of the dollars others have generously donated to our organisation. To uphold the public's trust, we hold ourselves accountable, both to our donors and to the Australians whose lives we strive to improve.

To all of our supporters, we extend our heartfelt thanks for joining our fight against heart disease. Your support powers our researchers. You are the heart of our organisation.

REDFEB 2016 ▽

REDFEB is Heart Research Australia's signature fundraising campaign during February, aimed at raising awareness of heart disease and raising much needed funds to continue funding innovative first-stage heart research. Now in its fourth year, REDFEB has enjoyed participation, not only from individuals who want to make a difference, but also from businesses and schools who made heart health a priority during February.

Hundreds of individuals participated nationally in REDFEB 2016 through various fundraising activities which included schools supporting National Wear Red Day (26 February), community groups raising money through walks and corporates hosting healthy events for their employees.

REDFEB 2016 raised close to $100,000, contributing towards a greater pool of funds that help Heart Research Australia continue its financial support towards heart research.

A special mention goes to Heart Research Australia Ambassadors, Anna and Alessandro Pavoni, who raised funds during their Valentine's Day dinner service at both of their restaurants Ormeggio at the Spit and Chiosco.

The usual hot pink of the Bold and Beautiful Swim Squad, Manly was turned red on the 13th February, with approximately four hundred swimmers setting off from Manly Beach to Shelly Beach and back, swimming around 750m each way in support of Heart Research Australia.

Thank you to everyone who supported REDFEB and for showing your support towards fighting heart disease.

The story of life-saving research

1990s

Heart attack mortality rates at RNSH fall from 30% to just 8% through the introduction of stents in the treatment of heart attacks.

1991

A heart research centre is set up at RNSH, a first for the hospital, with research laboratories, specialist staff, and other much needed research facilities.

1996

First Patron of the Foundation appointed, Dame Leonie Kramer AC DBE.

1997

The Foundation establishes the academic Chair of Cardiology in association with the University of Sydney, a first for the Department of Cardiology, opening up new research avenues. Professor Helge Rasmussen still holds this position today.

Annual Heart Health Lunch ▷

The Annual Heart Health Lunch remains one of our most popular events of the calendar year. Coordinated by a group of dedicated ladies, known as the Heart Throbs, who established the Red & White Committee over 10 years ago to support first-stage heart research.

Nearly 200 guests attended the flawlessly organised event thanks to the ladies of the committee: Jenny Carr, Fiona Taylor, Lynne Ravenhall, Lynn Varvel, and Lori Farrar. The lunch was held at the beautiful Deckhouse in Woolwich and attended by leading cardiologists, researchers, corporates and individuals who are passionate about supporting life-saving heart research.

Auctions, raffles, donations and tickets sales helped to raise $21,000 in FY 2015.

Golf Charity Challenge ▽

Every year golfing enthusiasts enjoy our annual Golf Charity Challenge, hoping to get a hole in one for heart research.

The successful day not only sees players enjoying the beautiful scenery at the Long Reef Golf Club, but also results in significant funds being raised to support Heart Research Australia's pioneering research into heart disease – which affects 1.4 million Australians, killing 54 Australians every single day.*

Participants enjoyed a well earned lunch after a hard day on the green whilst listening to inspirational heart survivor accounts and information about current research projects, future endeavours and the potential of these to improve community heart health.

Heart Research Australia's Board Member Paul Allison, who together with Gary Dawson from Bullant Sport, brings this event together raising a generous $16,000 through golf day entries, raffles and auctions. Thank you for your continued support – it is greatly appreciated.

*Australian Bureau of Statistics. Causes of death 2013 (3303.0). March 2015.

Red Heart Rugby Day △

Norths Rugby Club is a long-standing community partner of Heart Research Australia, through their annual Red Heart Rugby Day.

"Heart disease is the leading cause of death in Australia and Heart Research Australia does some ground-breaking work in looking at new ways to fight this issue," says general manager Adam Fulepp. "Our club's motto is; 'to better the player, to better the person, to better the community'. We feel this partnership certainly fits in within our motto and we look forward to working with Heart Research Australia well into the future."

Tragically, six babies are born every day in Australia with heart defects.

Angus was one of these special babies, who is now an active teenager and avid rugby supporter! Heart Research Australia invited Angus to be the 23rd man at the match, giving him the opportunity to lead the 1st Grade team onto the oval and sit on the bench with the reserves. A small tribute to this remarkable young man and his fighting spirit!

Players wear specially designed socks with hearts on the day, and rugby supporters not only enjoy a good game of rugby, but also support the raffle and get free heart health advice from Heart Research Australia staff during the day.

The 2015 Red Heart Rugby Day raised close to $4,000, demonstrating the importance of combining sporting communities with heart health awareness.

The story of life-saving research

1998

The Foundation establishes the academic Chair of Preventative Cardiology. Professor Geoffrey Tofler still holds this position today.

1999

The North Shore Private Hospital opens.

2000s

During this decade, research funded by the Foundation sees remarkable results. For instance, by instigating the diagnosis and triage of heart attack victims in ambulances, the death rate from heart attacks is reduced further to 2% – setting a new international standard in cardiac care.

Researchers identify triggers and subsequently prevention strategies for heart attack; and links between bereavement and heart attacks.

Running Events ▷

Heart Research Australia has seen a growing momentum in the support through running events. In 2015-16 we welcomed 730 runners from all over Australia into Team Red, with a collective total tally of $31,000.

Special mention goes to AON who had 67 staff members running to raise funds for Heart Research Australia during the Sun Herald City2Surf in August 2015. This was the first time we were the beneficiaries of a corporate entry for the City2Surf, which resulted in $19,489 being raised. This fantastic result was down to the hard work and great team effort from AON staff, particularly the organisers.

What impact does your support have?

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

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

Heartfelt Thank You

We wholeheartedly thank all our community fundraisers who have been instrumental in helping us achieve many milestones throughout 2015 – 16.

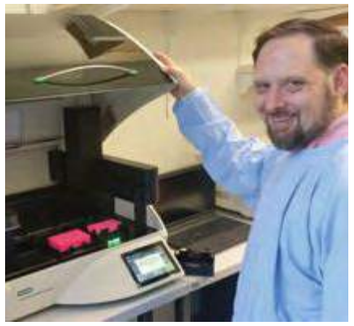
Trusts and Foundations

Heart Research Australia is very grateful to the support we receive from Trusts and Foundations who provide vital financial support for our research programs.

Last year we received invaluable support from the Mill House Foundation, The Lady Proud Foundation, Emorgo Foundation Pty Ltd, Ernst & Young Foundation, Macquarie Group Foundation, Wood Family Foundation, Vonwiller Foundation and the Skipper Jacobs Charitable Trust.

The Mill House Foundation, headed by the Cornock family, have supported Heart Research Australia for over 20 years and in particular, Associate Professor Martin Kluckow's Neonatal Heart Research program for the past 12 years. Their generous donations help to employ a Research Nurse, Yan Chen, who is helping to develop and conduct new clinical studies in our quest to understand neonatal heart problems that affect many of the premature and sick newborns that are cared for each year. Funds have also helped cover the costs of essential medications and equipment needed for Dr Kluckow's vital research.

The Mill House Foundation also contributed to the purchase of a BioRad QX200 Droplet Digital PCR machine to assist Dr Anthony Ashton's research into the triggers for pregnancy induced heart failure.



△
Dr Anthony Ashton with the BioRad QX200 Droplet Digital PCR machine.

The Lady Proud Foundation continue to be major supporters of Heart Research Australia's Chair of Cardiology and Professor Helge Rasmussen's research. The Foundation has funded the Chair position since 2012 and have been major supporters of Heart Research Australia since 2002. We are truly thankful for the commitment, loyalty and support from Trusts and Foundations in helping us fund ground-breaking medical breakthroughs to help us keep families together for longer.

The story of life-saving research

2000s

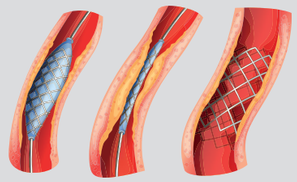
Research results in improvements in heart function in pre-term babies preventing disability.

While investigating a novel treatment for heart failure, researchers discover its potential to help in treatment of cancer.

2001

The first Annual Sportman's Lunch is held by Con Dedes, raising over $200,000 in the years to come.

The first drug-eluting heart stent is implanted. Releasing an anti-closure drug after cardiac angioplasty, the resulting improvement in survival rates has led to a reduction in the use of bypass surgery in favour of stent implantation.



OUR CORPORATE SUPPORTERS

Heart Research Australia is 100% community funded, relying heavily on the generosity and financial support from not only our wonderful community supporters, but also from the corporate sector.

We are incredibly fortunate to work with organisations that share our mission to reduce the devastating impact of heart disease.

ICAP Charity Day

Heart Research Australia was selected as a beneficiary of ICAP'S Global Charity Day in Sydney on Wednesday 9th December 2015. ICAP brokers dressed in fancy dress costumes instead of wearing their usual business suits. Charity ambassadors including Heart Research Australia's Ambassador Chris Russell, helped the brokers execute trades and 100% of commission and profits from the day's work were given to 15 other charities in Australia. In 60+ offices around the world and thanks to the efforts of ICAP customers, staff and suppliers, a fantastic £7.5 million was raised in 2015, bringing the total amount raised over 23 years to nearly £127 million for charities worldwide. ICAP Sydney's generous donation to Heart Research Australia was allocated towards Dr Paul Bonnitcha's research into using MRI to identify arteries at risk of blockage. Paul is one of our most talented early career researchers and is a radiation oncology registrar at RPA Hospital and Sydney Medical School Foundation Fellow based at Royal North Shore Hospital.

Heart Research Australia board member Charlie Frew OAM also presented Heart Research Australia's corporate wellness program, Heart Health Matters to ICAP staff in October. The Heart Health Matters program empowers employees with heart health information and offers advice on how to live a healthy balanced lifestyle.

Ink Project

Independent creative agency Ink Project was awarded the account for Heart Research Australia, tasked to prepare the market and generate engagement for REDFEB, building brand recognition prior to activation in 2016.

Not only are the team from Ink extremely passionate about the importance of heart health, more importantly their support of Heart Research Australia is also reflected in their generously discounted fees, which afford us the opportunity to work with them.

These companies lead the way by example, demonstrating their support of life-saving heart research. Thank you for your ongoing support.

Anytime Fitness and Anytime Vision

We are very fortunate to have the support from Australia's number one health club Anytime Fitness, along with their media and partnership company Anytime Vision for our annual REDFEB campaign.

The national gym group support and assist Heart Research Australia in raising awareness of heart disease in Australia by promoting REDFEB to their 500,000 members through sponsored adverts on their digital advertising screens.

This partnership is a perfect synergy of two organisations joining forces with one goal in mind - to empower Australians to be healthier and promoting REDFEB as the ideal platform to do this.

The story of life-saving research

2004

The first Annual Heart Health Lunch is held by a group of volunteers, today known as the Red & White Committee.

Findings from Professor Helge Rasmussen's research in heart failure is patented.

2008

Our researchers move into a new cutting edge research centre, the Kolling Building at RNSH, bringing together over 350 researchers from across the campus and opening up new doors for research collaboration. Our supporters donate over $370,000 to upgrade equipment as part of this move.

MESSAGE FROM PROF GEOFFREY TOFLER

Professor of Preventative Cardiology, and Hon Medical Director, Heart Research Australia

The 30th Anniversary of Heart Research Australia provides a unique opportunity to celebrate our prior research achievements, and to eagerly look forward to future ground-breaking research to combat heart disease.

While we and others have already made significant inroads into heart disease prevention and treatment, it remains the number one killer in our society, urgently needing new approaches.

Cardiologists and researchers at Royal North Shore Hospital, with the invaluable support of Heart Research Australia, are working hard from basic molecular to population studies, utilising a variety of techniques. All of this work – which includes national and international collaborations - has the goal of improving the lives of members of our communities, not only in Northern Sydney, but throughout Australia and internationally.

I can cast my eye on two current projects my team and I are pursuing; they tell a story of how a clinical observation may lead to a hypothesis that, with funding support, can then be tested in a research study. For instance, the awareness that up to $^{2}/_{3}$ of smokers quit once they have experienced a heart attack, led us to design and test a video based program that enables a smoker without heart trouble to personally visualise the potential consequences to the smoker and their family members of having a heart attack due to smoking. Over 50% of our initial smokers managed to quit using our program. We are now excited to be evaluating, with the help of an innovation grant and an Australian patent, an internet-based version that enables us to reach smokers throughout Australia, providing the opportunity to make major inroads into the harmful effects of smoking and also presenting the tantilising possibility of using this technique for other behaviour modifications.

A second research program, which began for me at Harvard University, investigates the observation that heart attacks, strokes and sudden death occur more in the morning than at other times of the day. This led to characterising the increased risk of heart attacks after acute emotional stress (including bereavement), severe physical exertion (especially in sedentary individuals), heavy meals, respiratory infections and other triggers. With the help of the world-class early heart attack angioplasty program at Royal North Shore Hospital, we have been able to investigate the links, including genetic, between these stressors and heart attack. With the assistance of Heart Research Australia, we are poised to use these observations to suggest new preventive treatment options, publicise our findings in bereavement, and hopefully initiate a large, multi-centre trial of Triggered Acute Risk Prevention (TARP) as a novel approach to prevent heart attacks and stroke.

These and other projects that we hope will result in medical breakthroughs can only be done through the cohesive interaction of medical students, PhD candidates, research nurses, junior and senior laboratory and administrative staff, and senior cardiologist researchers.

On behalf of the researchers, I would like to thank Tony Crawford, Board Chairman, Nicci Dent, CEO, current board members and staff, as well as all their predecessors, for their expert stewardship of Heart Research Australia, which has enabled us to reach this 30th year milestone. I particularly want to acknowledge the contribution of founding directors Dr John Gunning and Prof Stephen Hunyor, who have only just recently stepped down from their major leadership roles. Similarly, Paul Allison will shortly complete a superb 10-year role as a board director, continuing the rich family legacy begun by his father John Allison.

None of the research advances and careers launched of talented young investigators thus far could have occurred without the generosity of you and all Heart Research Australia's supporters. As we confidently look to the future, we embrace all opportunities to enthusiastically explain our findings to you, and to partner with you to translate our new research ideas into improved prevention and care of heart disease.

> *"While we and others have already made significant inroads into heart disease prevention and treatment, it remains the number one killer in our society, urgently needing new approaches."*

The story of life-saving research

2008

A cardiac magnetic resonance imaging research facility is established at RNSH with financial support from the Foundation. The non-invasive imaging capabilities provide researchers with a revolutionary tool for investigating heart disease.

2010

Dr Ravinay Bhindi is awarded a Life Sciences Award by the NSW Office of Science and Medical Research in recognition of his contribution to research.

Heart Research Australia funded research by Prof Gemma Figtree, Prof Helge Rasmussen and A/Prof Ravinay Bhindi is recognised with significant grants from the National Health and Medical Research Foundation.

MAKING BREAKTHROUGHS IN HEART DISEASE HAPPEN

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.

In 2016 our inspiring researchers continued in their quest to finding new innovative ways to cure and treat heart disease. Please continue below to read about the interesting projects our wonderful researchers are currently focused on.

Heart Research Australia continues to support the two Chairs of Cardiology, Professors Helge Rasmussen and Geoffrey Tofler. You will see many examples of their work and influences as you read through this report.

Salary Support enables research assistants to take care of some of the administrative and routine aspects that are part and parcel of the research process, enabling our high level researchers to be focus on just that: research

Our Professors and Associate Professors are able to concentrate more fully on clinical and theoretical components of their projects when they have a Lab Manager, research nurse or assistant supporting them.

We are extremely proud of the $1.49 million we have contributed in the 2016 financial year towards combating Australia's leading killer and creating more heart survivors.

How does producing resistance to the loss of blood supply reduce the damage caused by a heart attack?

Project Title:
Egr-1 and preconditioning

Principal Investigator:
A/Prof Ravinay Bhindi
(formerly Dr Ben Rayner)

Coinvestigator:
Dr Muntasir Billah

Funded since: 2013

Amount: $145,800 over 3 years

This project examines the phenomena of myocardial preconditioning where short episodes of non-lethal ischemia in the limb confers protection against heart attack damage.

To date, results suggest that Egr-1 plays a master regulator role in remote preconditioning of the heart. A/Prof Bhindi has demonstrated that the mechanism by which remote preconditioning induced Egr-1 activation directly renders the heart resistant to ischaemic damage during heart attack. He will also be analysing blood samples to study the circulating proteins which will help him to identify the proteins involved in the signal transduction mechanism. This research could aid in developing new therapeutics to prevent heart attack damage.

Did you know?

Each year, around 54,000 Australians suffer a heart attack.

This equates to one heart attack every 9 minutes.

Ref: Australian Bureau of Statistics. Causes of Death 2013 (3303.0). March 2015.

Can we use MRI to identify arteries at most risk from plaque formation?

Project Title:
Novel redox sensitive MRI contrast agents for imaging the vulnerable plaque.

Principal Investigator:
Dr Paul Bonnitcha

Coinvestigator:
Prof Gemma Figtree
A/Prof Stuart Grieve
Dr Elizabeth New

Funded since: 2014

Amount: $126,750 over 3 years

Hardening of the arteries and the formation of fatty plaques lining them are major contributors to strokes, heart attacks and peripheral vascular disease. Currently, we have no way of knowing which plaques are most likely to rupture and cause problems. Recent findings indicate plaque instability may be related to low oxygen levels within them, so a key aim is to develop ways to detect these vulnerable plaques.

This past year we have successfully synthesised two sets of compounds that act as 'on-off' magnetic (MRI) switches to detect low oxygen concentrations which are commonly associated with unstable plaques. We are currently doing work in cellular and biological models to identify whether different metal agent behaviours are maintained in more complex systems.

Our work has been presented at numerous conferences and was recently published in the Royal Society of Chemistry Advances.

We have also been permitted to attend the Integrated Medical Imaging in Cardiovascular Diseases in Vienna. The next step is to publish biological data from our second round of compounds.

"I am driven by the desire to push the boundaries of medical imaging to improve health outcomes in an area that impacts our society so greatly."

Can reducing free radicals improve the heart's ability to function?

Project Title:
ROS-inhibition of the Na+ pump and vascular function in vivo.

Principal Investigator:
Prof Gemma Figtree

Coinvestigator:
Prof Kathy Sweadner
Prof Richard Cohen
Dr Ben Davies
Dr Chris Bursill

Funded since: 2014

Amount: $150,000 over 3 years

With the support of Heart Research Australia we are striving to understand the mechanism by which free radicals participate in disease development in the heart and blood vessels, and importantly how cells in the cardiovascular system try to protect themselves against this.

Key proteins in the cell membrane can be modified by the increased free radical production during development phases of cardiovascular disease, becoming impaired in their function. A frustrating aspect of cardiovascular research has been the lack of impact achieved by administering patients dietary 'antioxidants'.

By understanding the intricate mechanisms and signaling pathways involved in protein changes in the cell membrane, we can try to overcome this paradox. We have discovered a new effect of a protein in the membrane of endothelial cells lining the blood vessels which protects surrounding proteins against free radicals.

We are currently working on delivery mechanisms of peptides derived from this given oxidative signaling abnormalities and their effect on membrane proteins has been identified as a central mechanism for vascular disease (including hypertension and atherosclerosis) these findings and therapeutic developments have broad clinical implications.

This work has resulted in a number of publications, a patent application (under review), and additional funding through NHMRC.

A novel drug combination for heart failure.

Project Title:
Is treatment with an aldosterone antagonist beneficial in heart failure when co-administered with a beta 3 adrenergic agonist?

Principal Investigator:
Dr Chia Chi Liu

Coinvestigator:
Prof Helge Rasmussen
Dr Elisha Hamilton

Funded since: 2014

Amount: $150,000 over 3 years

Contributors to heart failure include raised oxidative stress within the heart cells, impairment of the way that provides the cell with energy, and raised levels of sodium in cells. These three mechanisms interact in a vicious circle: raised sodium levels interfere with the provision of energy, this increases oxidative stress and increased oxidative stress impairs the transport of sodium out of the cells. So far, results suggest that beta3 adrenergic agonist therapies are beneficial for heart failure treatment. Such information is important for fine-tuning the overall treatment regimens.

"Cardiovascular disease and cancer account for approximately two-thirds of all deaths globally. These diseases undermine overall health, shorten generational life expectancy and cause enormous suffering, disability, and economic costs. I worked within a hospital environment and witnessed first-hand the burden of these diseases on human life. I enjoy searching for causes, discovering and creating solutions. My overall aim is improving the survival and quality of life for patients suffering from these diseases."

How does decreasing levels of Egr-1 limit heart injury after a heart attack?

Project Title:
Cardioprotective effect of remote ischaemic preconditioning and the role of Egr-1 as a master switch regulator.

Principal Investigator:
Dr Muntasir Billah

Coinvestigator:
A/Prof Ravinay Bhindi

Funded since: 2014

Amount: $90,000 over 3 years

Once the blood supply is restored after heart attack by opening up the coronary artery, the heart is further damaged by ischemia-reperfusion injury.

In this study Dr Billah is looking at the phenomena of myocardial preconditioning, where repeated short episodes of non-lethal heart attacks are able to protect against subsequent ischaemic damage. He is particularly looking at the role of one transcription factor (Egr-1) that acts as a 'master switch' in injury response in a variety of pathological settings.

The aim of this project is to assess the relationship between this master switch regulator and remote ischaemic preconditioning.

Did you know?

Heart failure is a chronic and complex clinical syndrome that affects an estimated 300,000 Australians, with another 30,000 new cases diagnosed each year.

Ref: Australian Institute of Health and Welfare and the National Heart Foundation of Australia. Heart, stroke and vascular diseases – Australian facts 2011.

Can being aware of your own stress lower your risk of heart attack?

Project Title:
The Triggered Acute Risk Prevention (TARP) study.

Principal Investigator:
Prof Geoffrey Tofler

Coinvestigator:
Dr Thomas Buckley
Monica Spinaze
Dr Elizabeth Shaw
Prof Andrew Tonkin
A/Prof Christopher Ward

Funded since: 2014

Amount: $146,000 over 3 years

The TARP Study represents a new approach to reducing the risk of heart attack. The aim of the study is to see whether people with risk factors for heart disease or with known heart disease can identify stressful activities of daily life and take standard medication at this time to lower their risk of heart attack. We will compare this approach to 'control subjects' who do not pre-emptively take the medication.

The activities which we will evaluate are heavy physical exertion, acute emotional stress: anger and anxiety, heavy meal consumption and respiratory infection, which have all been linked to an increased risk of heart attack. Providing protection during these stressful events has not been attempted before. Eventually this strategy could be a helpful addition to the usual daily medications that people take.

An abstract on the project was presented at the Cardiac Society Conference of Australia and New Zealand. This abstract reported that the Triggered Acute Risk Prevention (TARP) strategy was well tolerated and accepted by the participants for the 4-month duration of the protocol. A trend toward greater perceived control was observed among the treatment subjects, with a greater change (disagreement) to the question "I feel I have little control over things that happen to me" in the treatment versus controls.

Can inactivating an enzyme in the heart cell membrane improve the sodium pump's action?

Project Title:
Enzymatic Redox regulation of the Na+ pump.

Principal Investigator:
Prof Helge Rasmussen

Coinvestigator:
Dr Chia Chi Li
Dr Alvaro Garcia

Funded since: 2014

Amount: $149,770 over 3 years

The membrane sodium pump is one of nature's fundamentally most important molecules. Its molecular structure is now well defined, as is the way it pumps sodium and potassium. However, how its activity is increased or decreased in response to changing needs have been highly controversial.

We previously understood how glutathionylation can inhibit the pump. We now also understand how a decrease in glutathionylation via cell signaling can stimulate the pump.

On a broader level, our studies also detract from the widely held belief that 'antioxidants' (e.g. in wine or vitamin pills) are beneficial. Such compounds are not nearly specific enough to have any predictable beneficial effect in cells, nor is there evidence from clinical studies for overall benefit in people. 'Antioxidant' benefit can, however, be achieved with pharmacological compounds.

Potential benefits specifically related to this project include diabetes and heart failure.

What is the Sodium Potassium Pump?

Essentially, it's an enzyme found in the membrane of virtually every human cell and it functions like a revolving door. Its main job is to keep sodium (or salt) levels inside the cell low, and potassium levels inside the cell high while producing the opposite effect on the other side of the cell wall.

The goal of this process is to return, or keep the cell at its optimum state - so it's always pumping sodium out and potassium in. Among other things, this process is vital for regulating the heartbeat because if the balance is seriously wrong, it can be fatal.

Does stiffened heart alter stem cell behaviour?

Project Title:
Mechanosensitivity of stem cells grown on hydrogel senses stiffness of damaged heart tissue.

Principal Investigator:
Dr Yu Suk Choi

Funded since: 2014

Amount: $147,707 over 2 years

One of the challenges in regenerating heart muscle after myocardial infarction (heart attack) is that the microenvironment of damaged heart muscle becomes much stiffer. The stiffened tissue can mislead stem cells into developing into other cell types (e.g. bone-like cells) rather than beating cardiac muscle cells. This is due to the phenomenon called mechanosensing (sensing mechanical properties of tissue) and it makes tissue stiffness an active controller of stem cell fate.

In this project, to mimic the stiffness changes of heart tissue after myocardial infarction, we have developed a novel, easy-to-reproduce method to fabricate linear stiffness gradients using smart hydrogels that span a range of stiffness relevant in healthy and infarcted heart tissue. The gradient system was analysed and confirmed with several complementary techniques, including the use of cutting edge optical coherence elastography.

In following experiments, stem cell behaviour and their cardiac potential will be examined on these smart hydrogels. This reductionist approach will enhance our understanding of how stem cells and ECM stiffness interact in normal or damaged heart tissue. This will provide better insights into production of natural ECM-mimicked biomaterials for cardiac regeneration.

> *"With Heart Research Australia's generous support, I have been able to establish an independent lab in three years and attract nationally competitive grants."*

Is Pre-eclampsia in pregnancy related to peri-partum cardiomyopathy?

Project Title:
The role for the TPP-isoform of the thromboxane A2 receptor in pre-eclampsia.

Principal Investigator:
Dr Anthony Ashton

Coinvestigator:
Prof Jonathan Morris

Funded since: 2014

Amount: $150,000 over 3 years

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

Most pregnancies result in the birth of a healthy baby to a healthy mother; however, some pregnancies experience unforeseen, and currently untreatable, complications.

One of the most severe complications that can manifest in pregnancy is peri-partum cardiomyopathy (PPCM) whose cause is unknown. However, 50% of PPCM patients experience pre-eclampsia, while only 5% of the general pregnant population develop this condition of high blood pressure during pregnancy. We therefore believe the cause of PPCM and pre-eclampsia is linked.

Over the last year we have determined that the trigger for pre-eclampsia is a receptor whose activation disrupts placental growth and development. We believe that targeting this receptor will offer the first viable treatment to identify and manage patients who will develop pre-eclampsia and PPCM.

Did you know?

Pre-eclampsia is a serious disorder of pregnancy characterised by high maternal blood pressure, protein in the urine and severe fluid retention.

It is the most common serious medical complication of pregnancy, affecting around 5 -10% of all pregnancies in Australia.

Can paracetamol close a duct in a premature baby's heart?

Project Title:
PDA (Paracetamol Duct Action) trial.

Principal Investigator:
Prof Martin Kluckow

Coinvestigator:
A/Prof Nick Evans (Royal Prince Alfred Hospital)
Dr Hazel Carlisle
The Canberra Hospital
Yan Chen – research nurse

Funded since: 2012

Amount: Funded by the Mill House Foundation

This Australian trial of an alternative medical treatment for persisting ductus arteriosus in three NSW centres is now completed with 57 patients enrolled. Currently available medical and surgical treatments for duct closure in preterm infants have concerns regarding both efficacy and risk of side effects.

Prof Kluckow and his team hypothesised that giving a five day course of simple oral paracetamol to premature infants born before 33 weeks of gestation with long standing (over 2 weeks) symptomatic PDA would result in reduction or closure of the duct, without compromising liver function.

Again, the Foundation funded ultrasound machine is an essential part of this study as is the funding of Prof Kluckow's research nurse who coordinates the study and data collection.

The results (yet to be published) show some positive effect of paracetamol on closing the PDA in infants more than two weeks old and will add considerably to the existing information about this new role of paracetamol.

Project Title:
The u-PDA Trial (Ultimate PDA Trial)

Principal Investigator:
Prof Martin Kluckow
Dr Koert deWaal (John Hunter Hospital)

Coinvestigator:
Yan Chen – research nurse

Funded since: 2016

Amount: Funded by the Mill House Foundation

This ultimate PDA trial will for the first time target early treatment of the patent ductus arteriosus (PDA) in a state of the art clinical trial design that will allow Prof Kluckow to review the real natural history of treated and untreated PDA's.

The biggest single issue that has prevented neonatologists around the world from being able to agree on the best management of the PDA in premature infants has been a lack of understanding of this natural history.

The PDA is a normal structure in the foetus that should close at birth, but in a significant proportion of premature infants it stays open and can redirect blood from the body into the lungs resulting in blood being removed from the brain/gut/kidney side of the circulation and flooding into the lungs.

The uPDA trial design will answer this question. The trial has started enrolling with seed funding from Mill House Foundation. Funding to expand the trial to 10-15 other centres in Australia/New Zealand will be sought if the initial pilot trial is successful.

Project Title:
The APTS (Australian Placental Transfusion Study)

Principal Investigator:
Prof Martin Kluckow
The APTS trial group

Coinvestigator:
Yan Chen – research nurse

Funded since: 2012

Amount: Funded in part by the Mill House Foundation who support the research nurse time and have donated the ultrasound machine used in the study.

The Australian Placental Transfusion study has been underway for 5 years and is due to close this month after having enrolled almost 1600 babies nationally and internationally. Prof. Kluckow and Royal North Shore Hospital were the 4th highest contributor of patients, contributing over 120 patients to the study.

The APTS study investigated the utility of deferring the cord clamping time in very premature infants from the usual 10 seconds or less to 60 seconds. The study hypothesises that the extra time before cord clamping allows more blood to transfer to the baby at birth, resulting in improved blood pressure and heart function which in turn translated to less brain injury and better developmental outcomes.

Even though the acute part of the study is now finished there is still a 2 year follow up period to be completed before the final results of this trial will be available.

SALARY SUPPORT

Annette McCook, Personal Assistant for Professor Gemma Figtree's Oxidative Signaling Laboratory.

Administrative support from Heart Research Australia is used to fund the part time salary of Ms Annette McCook (~0.3 FTE) to perform essential administrative duties for Professor Figtree, her laboratory team, and the Cardiology Research Committee at Royal North Shore Hospital.

Annette performs vital duties in administrative aspects of grant preparation and governance, communication with the research office and ethics committees, diary organisation, organisation of academic meetings, assisting visiting students and scientists with visas and paperwork and keeping record of expenditure on consumables and other research costs.

Annette has also been vital in preparing reports for the university and hospital regarding research metrics from the cardiovascular group.

Dr Sean Coffey, Heart Research Australia Cardiovascular Imaging Fellowship.

The Cardiovascular Imaging Fellow position supports advanced cardiovascular imaging services, both clinical and research.

The Fellow attends and reports all cardiovascular MRIs at Royal North Shore Hospital and North Shore Radiology and Nuclear Medicine, provides advice on advanced cardiac imaging to inpatient and outpatient teams across the North Sydney Local Health District, and supervises all coronary cat scans at Royal North Shore Hospital.

In addition, the Fellow provides clinical and imaging support to a number of research projects across the region, for example new treatments for heart attacks and new methods of assessing heart disease.

Dr Owen Tang, Manager for Professor Gemma Figtree's Oxidative Signaling Laboratory.

Professor Figtree's Laboratory strives to understand the way reactive oxygen species affect disease in the heart and blood vessels. While elucidating the pathophysiology of the disease, we have developed a novel therapeutic protein delivery system to prevent or reverse these effects, which has implications for heart failure patients as well as atherosclerotic disease that causes heart attack and stroke.

As Manager, Dr Tang is a key figure in the lab, sharing his knowledge and expertise with graduate students and medical researchers.

Anthony Dona, Translational Research Laboratory Manager.

Dr Anthony Dona's focus is on the prognosis of cardiovascular disease and obesity. He also worked with two PhD students on better understanding metabolic changes in the heart during myocardial infarction and the best ways to precondition the heart muscle tissue to the damage of a heart attack.

Dr Elisha Hamilton, Laboratory Manager for Professor Helge Rasmussen.

As well as being directly responsible for performing many of the experiments that are conducted within Prof Rasmussen's laboratory (co-authoring 8 original scientific publications since becoming the laboratory manager in 2011), Dr Hamilton also provides a supervisory role to both students and research assistants within the lab.

In addition, Dr Hamilton performs many academic administrative duties including; work health and safety representation, preparation and submission of applications to funding bodies, preparation and submission of scientific manuscripts for publication as well as preparation and submission of applications for ethics approval.

Sally Tandy, Personal Assistant to Professor Helge Rasmussen.

Sally provides administrative support for the work of Prof Helge Rasmussen, such as patient correspondence, proof reading and editing manuscripts, compiling reference lists and general assistance, allowing the Professor more time for his valuable research work.

Yan Chen, Research Nurse for Prof. Martin Kluckow

The Mill House Foundation generously provides support for a part-time Research Nurse for Professor Kluckow's research. This position helps Prof. Kluckow develop and conduct new clinical studies in his quest to understand the heart problems that affect many of the premature and sick newborns that are cared for each year at Royal North Shore Hospital.

Yan Chen has been in the position since Feb 2016 and brings with her some important new skills. Yan has assisted Dr Kluckow with the following completed projects; The Echocardiographic Sub-study of the APTS trial, and PDA (Paracetamol Duct Action) trial. She will also assist on ongoing and new projects, the APTS (Australian Placental Transfusion Study) follow up period and The u-PDA Trial (Ultimate PDA Trial).

In addition to the main research projects of cardiac function and management in preterm infants mentioned above, Yan will continue to assist with several other important non-cardiac projects in the Newborn Care Centre. These include several studies of respiratory support and use of oxygen in the preterm infant, a trial of a new brain protection medication and some projects around optimising nutrition in the preterm infant.

The story of life-saving research

2010

Dr John Gunning, Head of Cardiology RNSH, and Foundation Vice Chairman, receives an AM for his services to medicine and contributions to the community.

2011

Professor Helge Rasmussen receives RT Hall Prize, the Cardiac Society of Australia and New Zealand's most prestigious research award.

Establishment of the North Shore Heart Research Foundation Advanced Cardiovascular Imaging Fellow – which has resulted in young researchers learning state-of-art techniques, collaborating with international centres of excellence, and contributing to major developments in application and interpretation of MRI to patients with heart disease.

2012

The North Shore Heart Research Foundation rebranded and changed its name to Heart Research Australia to nationalise.

Heart Research Australia

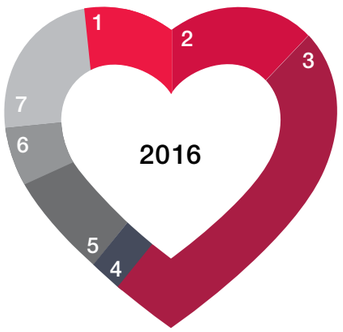
FINANCIALS

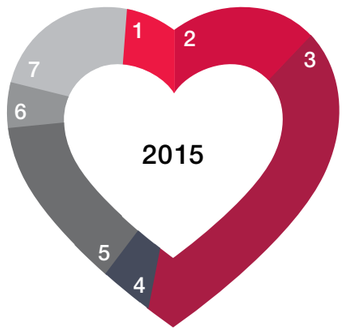
Heart Research Australia supports a centre of excellence that attracts world-class and emerging researchers to conduct ground-breaking research into the prevention, diagnosis and treatment of heart disease.

We are extremely proud of the $1.49 million we have contributed in the 2016 financial year towards combating Australia's leading killer and creating more heart survivors.

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 & Foundations.

How you've helped us over the past two years





	2016		*2015*
1 Appeals	10.69%		5.10%
2 Raffles	11.54%		12.40%
3 Bequests	38.39%		37.55%
4 Corporate	3.03%		7.35%
5 Corporate in kind	9.41%		19.25%
6 Community	4.82%		4.65%
7 Other donations	22.12%		13.71%

INCOME	2016	2015
Fundraising activities	3,003,959	4,520,833
Appeals	321,058	230,378
Raffles	346,511	560,683
Bequests	1,153,285	1,697,369
Corporate	91,053	332,210
Corporate in kind	282,795	870,369
Community	144,761	210,224
Other donations	659,907	609,465
Merchandise	4,588	10,135
Non-operative activities	17,604	101,285
Total income	**3,021,563**	**4,622,118**

EXPENSES	2016	2015
Employee costs	819,479	842,419
Fundraising	567,168	682,802
Administration	217,936	322,788
Corporate in kind	282,795	870,369
Research support	1,510,508	1,813,183
Total expenses	**3,397,939**	**4,531,561**
Net surplus/(deficit)	**(376,323)**	**45,146**

ASSETS & LIABILITIES	2016	2015
Cash and cash equivalents	391,257	796,020
Trade and other receivables	222,365	53,788
Financial investments	936,289	1,102,060
Plant and equipment	19,966	29,948
Intangibles	83,664	66,252
Inventory for distribution	83,863	97,711
Total assets	**1,737,404**	**2,145,779**
Trade and other payables	167,421	196,586
Provisions	18,319	20,520
Total liabilities	**185,741**	**217,106**
Net assets	**1,551,663**	**1,928,673**

The story of life-saving research

2014

After seed-funding from Heart Research Australia, Prof Figtree receives Fellowship co-funding from NHMRC and Heart Foundation, and promotion to Professor at Sydney Medical School with a continuing appointment and salary support.

Researchers identify a new biomarker that reflects 'oxidative stress' is proving promising at detecting early cardiovascular disease in its early stages.

The Charles Perkins Centre opens at University of Sydney, with immediate collaborative opportunities taken up, particularly in cardiac MRI, and advanced microscopy as well as metabolomics, mass spectroscopy.

2015

Researchers identified a new therapeutic strategy to prevent adverse changes in the heart muscle after heart attack, which they are now working to translate to patients.

OUR GOVERNANCE

Board of Directors

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

Committees of the Board

The Board has established three Committees to assist and advise it on operational and strategic matters – the Finance, Audit and Risk Management Committee, the Research Advisory Committee and the Scientific Advisory Council. Other Committees and Working Parties may be established from time to time to address specific issues. Most Directors serve on at least one Committee, while individuals with particular expertise may be invited to join a Committee. The membership of the Research Advisory Committee and Scientific Advisory Council has recently been extended to include additional external representatives with appropriate qualifications and expertise.

The Finance, Audit and Risk Management Committee

The purpose of the Committee is to monitor significant financial planning, management and reporting matters of Heart Research Australia, to review and monitor the corporate governance, to make recommendations and deliver reports to the Board of Directors and to serve as the Board's audit committee.

It 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.

Research Advisory Committee

The purpose of the Research Advisory Committee (RAC) is to review applications made to the Foundation for financial support, to monitor the research activities funded by the Foundation and to make recommendations and deliver reports to the Board of Directors on matters relating to the primary objectives of the Foundation. Members of the RAC are all highly qualified researchers and practitioners.

Scientific Advisory Council

The Scientific Advisory Council has been established to review the current priorities for research expenditure and to advise the Board on the best allocation of available funds, consistent with the Constitution of the Foundation.

Our Constitution

Heart Research Australia is a company limited by guarantee. We are registered with the Australian Charities and Not-for-Profits Commission 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 of Australia (FA) and abides by the FIA's Principles and Standards of Fundraising Practice.

Our Board

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Dr Michael Ward MBBS (Hons), FRACP, PhD, DDU, FCSANZ

Research Advisory Committee

Chair
Dr Michael Ward

Members
A/Professor Ravinay Bhindi
Dr Christina Bursill
Professor Ben Freedman
Professor Levon Khachigian
Professor Geoffrey Tofler
Professor Carol Pollock
Professor Carolyn Sue

Scientific Advisory Council

Chair
Professor Gemma Figtree

Members
A/Professor Ravinay Bhindi
Tony Crawford
Dr Joshua Funder
Professor Levon Khachigian
A/Professor Gregory Nelson
Professor Vlado Perkovic
Tony Thirlwell
Professor Geoffrey Tofler
Dr Michael Ward

The story of life-saving research

2015

A/Prof Bhindi is the lead investigator on the use of a new intravascular imaging technique to assess the effectiveness of "sucking" clot out mechanically from a blocked coronary artery, in a major international clinical trial published in the European Heart Journal.

Heart Research Australia supported Prof Figtree is the chief convenor of the annual scientific meeting of the Cardiac Society of Australia and New Zealand.

2016

Heart Research Australia researchers at Royal North Shore and the Kolling Institute leveraged >$750,000pa of external competitive funding for salaries, equipment and project costs from sources such as NHMRC, Heart Foundation, Sydney Medical School Foundation.

Our Cardiologists identify a substantial increase in patients suffering heart attack that have no traditional risk factors (increasing from ~13% to 29% over a decade), and launch a new program of research to address mechanisms and new therapeutic approaches.

HONOURS BOARD

Heart Research Australia is entirely dependent on community support to fund our pioneering research. We are indebted to the extraordinary individuals and organisations whose generous support is helping to bring breakthrough discoveries closer.

Significant Benefactors $10,000 and over

Beryl Percival
Ian Bersten
Patricia McAlary
Yvonne and John Almgren AM

Significant Benefactors $5,000 and over

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Tony Crawford
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Gold Coast City Council
Heart Support Australia
MET Oatlands
North Ryde Golf Club
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- Jenny Carr
- Lori Farrar
- Lynn Varvel
- Lynne Ravenhall

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Merck Sharp & Dohme
NAB
Northern Sydney Local Health District
Ormeggio Pty Ltd
Ramsay Health Care Ltd
Shire Australia
Toshiba Australia Pty Ltd
Webb Lawyers

Gifts in Wills

The Estate of the Late:
Alan George Crook
Barbara Netherton
Barbara Stowell Netherton
Betty Madge Humphery
Coline Mary Gollan
Dennis McGroder
George and Mary Thompson
Geraldine May Haworth
Kenneth John Wilson
Maria Helena Elizabeth Jansen
Marjorie Iris Burgess
Sarah Auld
Small Family
Sydney Thomas Wickham
Trygve Halvorsen
Winifred Mary Donohoe

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Ernst & Young Foundation
Hanlon Foundation
Skipper Jacobs Charitable Trust
The Lady Proud Foundation
The Mill House Foundation
Vonwiller Foundation
Wood Family Foundation

The story of life-saving research

2016

MyHeartMate App launched to increase patient engagement with secondary preventative strategies and cardiac rehabilitation.

Heart Research Australia PhD Scholar Dr Keyvan Karimi Galougahi is awarded a Lucy Faulkner Fellowship for his post-doctoral research at Columbia University, NY.

Five patents have been filed and progressed in last five years based on discoveries made by Heart Research Australia supported researchers, including new treatment strategies for heart failure, and to prevent heart attack; new biomarkers to detect early heart disease, and new approaches to helping patients stop smoking.

TODAY

The Foundation has raised over $29,000,000 for heart research.

Heart
Research
Australia

Heart Research Australia

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