



Heart
Research
Australia

Keeping Families Together For Longer

Annual Report
2018



Heart Research Australia

Building 36
Royal North Shore Hospital
St Leonards NSW 2065

PO Box 543
St Leonards NSW 1590

P 02 9436 0056
E enquiries@heartresearch.com.au
W heartresearch.com.au

ABN 62 002 839 072



Contents

- 04** Blue Sky Thinking Keeping Hearts Beating
- 06** Message From Our Chairman
- 08** Message From Our CEO
- 10** Our Work
- 12** Matthew's Heart Story
- 14** Our Heartfelt Thanks
- 16** Volunteers
- 18** Corporate Supporters
- 20** Highlights From The Year
- 24** Our Research
- 38** Salary Support
- 40** Keeping Hearts Beating
- 42** Financials
- 44** Our Governance
- 46** Honours Board



Blue Sky Thinking Keeping Hearts Beating



Keeping families together for longer - DARRYL'S STORY

Professor Helge Rasmussen's incredible blue-sky research has led to a potentially new treatment for heart failure.

Helge was the cardiologist on duty when Darryl Lock, a fit and healthy 75-year-old, was admitted to Royal North Shore Hospital suffering from a heart attack in 2016.

At a follow up appointment, Darryl's wife Bronwyn asked Helge what the outlook was for Darryl's heart health. "Helge said there was quite a lot of damage. I was shocked – I was asking if Darryl would recover with no consequences and Helge wouldn't say."

Six months after his heart attack, Darryl began to develop heart failure due to the muscle damage caused by the heart attack. His symptoms began to worsen over a few days as his breathing became

more and more laboured, and Bronwyn could hear his lungs rattling when he was lying down. Their GP told them if it got any worse they should call an ambulance, which they did late one night.

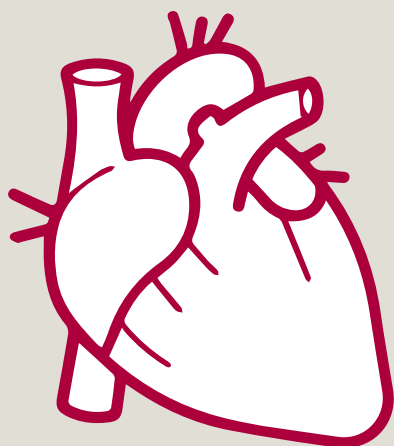
It wasn't until they got to the hospital that Bronwyn realised how bad it was. "He was hooked up to machines and had so many people standing around him. He looked terrible, he was so white, and he just looked like death," Bronwyn recalls.

"I look at the alternative options that were available had I not accessed Helge's treatment, and it looked fairly grim."

X-Rays of Darryl's chest were taken and showed that his lungs were full of fluid, which is a symptom from heart failure. Darryl was started on conventional

Heart Research Australia's Chair of Cardiology Professor Helge Rasmussen along with fellow researchers Dr Chia-Chi Liu, and Dr Elisha Hamilton discovered through innovative research funded by Heart Research Australia, that a new group of drugs, B3-AR agonists (one of which is already used as a treatment for an overactive bladder), are beneficial for heart failure treatment. Their research found that

administering B3-AR agonists can reduce sodium overload in heart muscle cells and decrease oxidative stress in heart failure. This innovative research has given several patients such as Darryl Lock a much better prognosis and is helping keep families together for longer. To learn more about Professor Rasmussen's ground-breaking research projects, please go to page 25.



Heart disease is the **SINGLE LEADING CAUSE OF DEATH** in Australia*

* AIHW National Mortality Database

treatments and was monitored in intensive care for the next 24 hours.

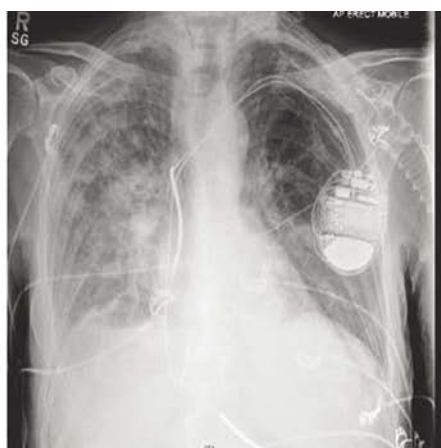
Unfortunately, his condition did not improve which prompted Helge to give Darryl an 'off-label' prescription for the Beta-3 AR agonist, which he had been researching over the last few years.

Darryl's response to the Beta-3 AR agonist treatment was incredible! Within a day or so, Darryl was breathing on his own and was no longer gravely ill. Below are the images of Darryl's X-Rays.

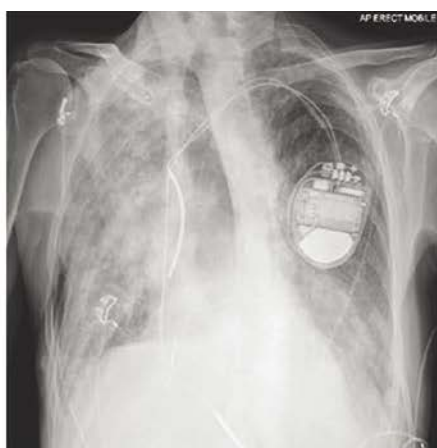
The first was taken when he was admitted to hospital – the white cloudy area, or "cotton wool", on the X-Ray is the fluid that was in Darryl's lungs. The second X-Ray, taken 24 hours later, looked worse, despite the conventional heart failure treatment Darryl was receiving.

The third X-Ray was taken just five days after Helge prescribed Darryl the Beta-3 AR agonist treatment, and as one can see, the fluid in Darryl's lungs had cleared and his heart failure symptoms were quickly diminishing.

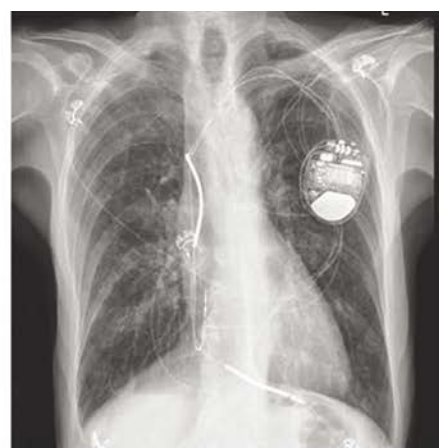
Darryl was discharged after 12 days in hospital, and now, nearly two years later, is doing remarkably well given how dire his prognosis was at the time. He reflects, "I look at the alternative options that were available had I not accessed the treatment, and it looked fairly grim. The level of health that I'm enjoying now, to the point where I'm feeling pretty normal, is a fantastic result as far as I'm concerned!"



Chest X-Ray taken at admission



One day after admission



Five days after starting Helge's treatment

Message From Our Chairman



It has been another busy year for Heart Research Australia supporting our vision of making breakthroughs in heart disease happen. We have done this with extraordinary assistance from our donors, staff, and volunteers. The work of our inspiring researchers would not have been possible without the generosity of the community which is making a real impact on the future of heart disease.

While the trend in fatality from heart disease is heading in the right direction, heart disease is still Australia's number one killer. Deaths caused by heart disease currently kills one Australian every 30 minutes compared to every 27 minutes a year ago so there is still much, much more to be done.

Most of Heart Research Australia's researchers are practising cardiologists based at Royal North Shore Hospital. This face to face interaction with patients helps them identify significant factors relating to heart disease that can assist their work as well as highlight key factors requiring further investigation and it is encouraging and exciting to see the

developments from their projects come to fruition. Darryl Lock's story, which is featured in this report, is just one example of this which is a direct result of the work undertaken by Professor Helge Rasmussen with our support. You can read Darryl's story on page 4 of this report.

It is thanks to the generosity of our Heart Heroes, sponsors and donors that these projects get to see the light of day. For this, we thank each and every one of you for your support which is all the more special as we receive no government funding to get these projects off the ground to a stage where our researchers can apply for a government grant for further work.

Our fundraising events this year were a particular highlight, made possible by the dedication and support from the community behind Heart Research Australia. These included Wear Red Day, our Golf Day and Gala Golf Dinner which brought together our core supporters who had great fun whilst raising awareness and funding for research towards heart disease.

Our annual Heart Health Lunch, now in its 17th year, was another fantastic event. This year it featured Head of Cardiology at Royal North Shore Hospital, Dr Greg Nelson and Dr Rebecca Kozor in an open panel discussion which focussed on the ever growing need to find new ways of diagnosing and treating heart attacks of increasingly younger patients who have minimal risk factors for heart disease. Over the last decade the percentage of these patients has increased from 11% to 27%. Thanks to Heart Research Australia, Professor Gemma Figtree's team are now investigating new ways to detect early development of heart disease in this group of people before it becomes life-threatening.

I would also like to thank all our inspiring researchers, Nicci Dent and our management team and our board of directors. This year, long serving members John Pegg (18 years), Geoff Tofler (15 years) and Gemma Figtree (7 years) retired from the board. Their considerable service to the Foundation has been amazing. In keeping with our board succession plan we have welcomed the appointment of Brigid Shute and Rebecca Kozor as members of our board. We celebrated the life of Cedric Deal, a founding member of our board more than thirty years ago, who sadly passed away during

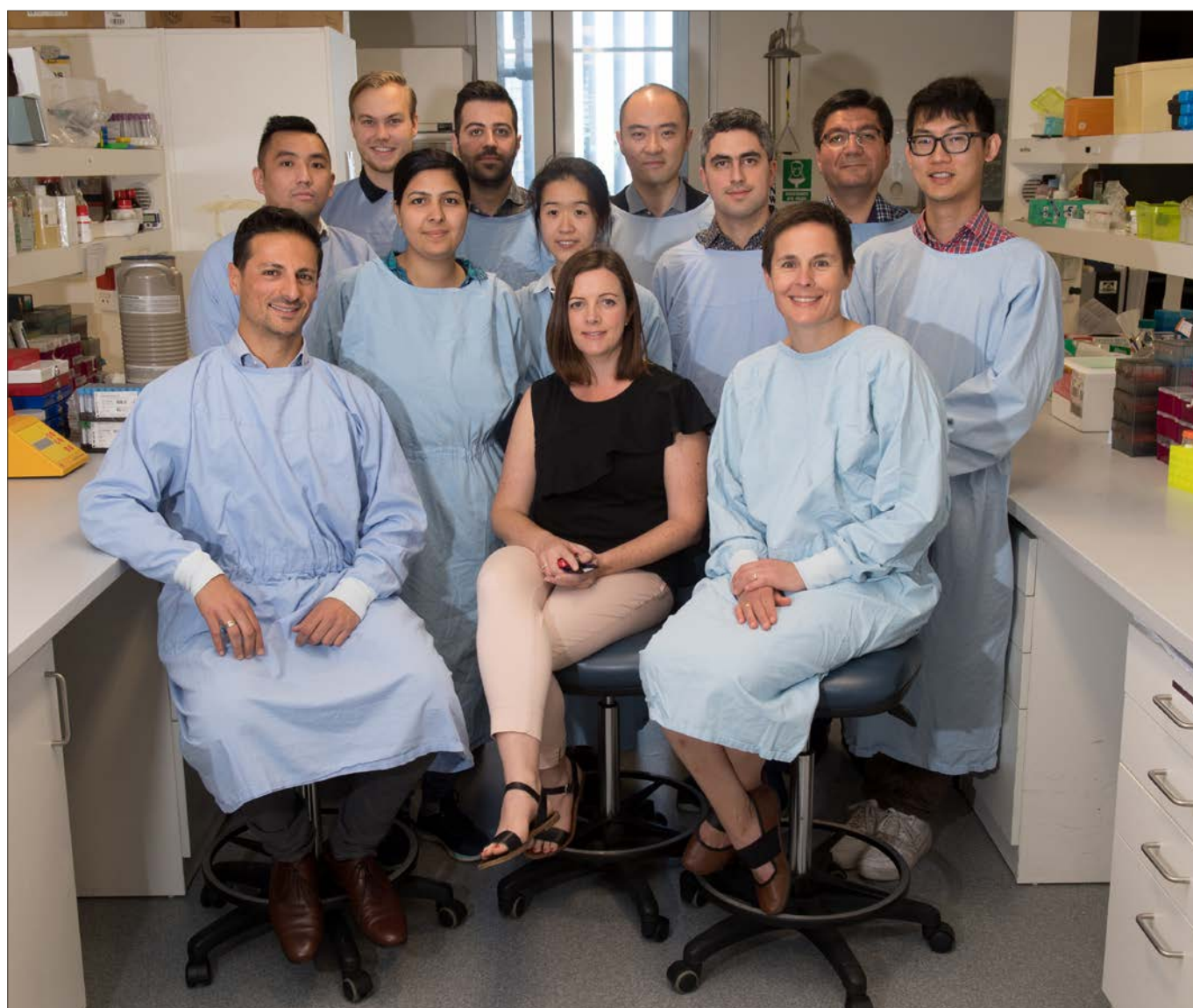
the year and we remember with great appreciation the legacy he has left us.

Finally, it only remains for me to once again thank you all for joining us during the year to help us with our fight against heart disease and in keeping families together for longer.

Tony Crawford

Tony Crawford

Chairman



Message From Our CEO



The support from the community for Heart Research Australia this year has been fantastic, and we are so grateful. This support has enabled us to revisit our strategic direction ensuring we are able to fund our world-class researchers now and in the future as they continue to make breakthroughs in heart disease happen.

Throughout the year Heart Research Australia has been narrowing its focus into three core areas; current research, donor growth and future funding. This revised strategy will enable us to help secure the future for continuous research into heart disease.

Our focus on current research has seen us continue to invest in two Chairs of Cardiology, as well as PhD students, project grants and funding for supporting scientists. This enables our researchers to continue their ground-breaking research into the prevention, diagnosis and treatment of heart disease.

As part of our strategic plan, we are concentrating on growing income for research by increasing the numbers of regular giving donors. Regular giving

donors (Heart Heroes) are vital to Heart Research Australia as they are able to provide stable and reliable funding for crucial first-stage research.

Whilst delivering current funding is important, ensuring future capital is key. This year saw us concentrate on building reserves to enable the funding of multi-year research projects in coming years. This is imperative in ensuring heart research continues to reduce the devastating impact of heart disease for subsequent generations.

Heart disease is Australia's biggest killer. At age 40, 1 in 2 men will be affected by heart disease in their lifetime, and for women at age 40 there is a 1 in 3 risk. At some point, heart disease is likely to affect us all, whether it's ourselves, our friends, or our family who are impacted.

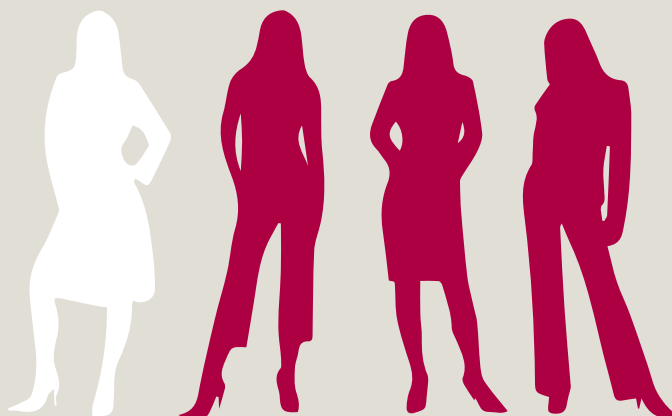
Being situated at Royal North Shore Hospital sets us apart from other heart organisations by bringing us into regular contact with patients and their families. This contact drives us to try to make peoples' journeys with heart problems easier. We have produced a series of patient cardiac videos about heart attack, angiograms, and cardiac rehab. This gives understanding to patients and their families helping make the process that little bit easier. To view these resources, visit the Heart Research Australia website.

The face of heart disease is changing. We are currently seeing more and more people come to the hospital for treatment of heart problems with no traditional risk factors, and increased cases of heart failure. It is only with the collective contributions of many of our donors that we can tackle these issues by funding and supporting initial stages of the **best** research projects.

From all of us at Heart Research Australia, I want to thank you so very much for your donations towards research this year. Thank you for partnering with us to help keep families together for longer and provide understanding and insight into Australia's biggest killer, heart disease. We are profoundly grateful for your support and look forward to another year of exciting new developments and opportunities.

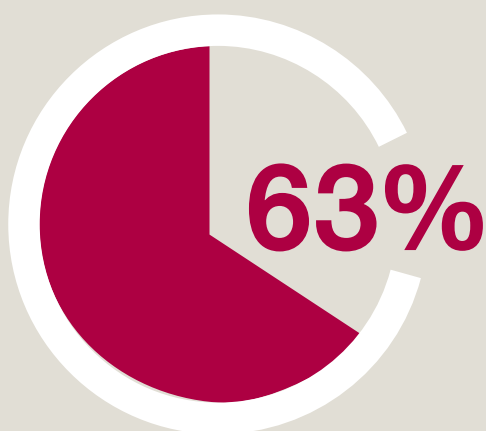


Nicci Dent
Chief Executive Officer



**3 X MORE
WOMEN**

die of heart disease than
breast cancer



of Australian adults are
overweight or obese

Indigenous deaths from Ischaemic
Heart Disease in 2013 was at least



than non-Indigenous Australians

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.

Our Vision

Making breakthroughs in heart disease happen.

Our Mission

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

**1 Australian
suffers a
heart attack
every
10 minutes.**

SOURCE: Australian Institute of Health and Welfare 2015. Australian hospital statistics 2014–15. Health services series no. 54. Cat. no. HSE 145. Canberra: AIHW.

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 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 and clinical trials 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 work is supervised by our 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 practising 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.

Chairs of Cardiology

Heart Research Australia funds two academic chairs of cardiology in association with the University of Sydney and Royal North Shore Hospital, as well as specialist support staff for these positions: The Chair of Cardiology is held by Professor Helge Rasmussen and the Chair of Preventative Cardiology is held by Professor Geoffrey Tofler. They are not only highly acclaimed scientists but also offer invaluable mentorship to some of our most promising postgraduate students and early career researchers. They are building a base of faculty talent which enriches Royal North Shore Hospital and attracts a world-class team of high quality investigators all focused on one thing: fighting heart disease.

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 devastating impact heart disease has on families and the community. The **focus** is seed-funding for cardiac researchers to investigate new areas. The **aim** is to make their work competitive for grants from national bodies such as the National Health and Medical Research Council.

Most of our researchers are practising cardiologists based at Royal North Shore Hospital. This places them in the best position to translate knowledge from the 'bench' (research in the laboratory) to patients 'at the bedside', and use insights from

interacting with patients 'at the bedside' back to 'the bench'. This patient interaction assists them to progress their research and identify new areas of heart disease requiring further investigation.

A good example of the 'bedside to bench' research trigger is the discovery of an increasing number of heart attack patients who have no traditional risk factors, such as high blood cholesterol, diabetes, hypertension or a family history of heart disease. This finding is now being investigated by Heart Research Australia's researchers to identify new ways of diagnosing heart disease, and enable early identification and treatment of these patients to better protect them.

Help us fight heart disease and help keep families together for longer!

Our researchers are on the threshold of life-saving breakthroughs and your support has the power to accelerate the impact of their research.

Your donations and the funds you raise contribute to 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 'Heart Hero' regular donor*
- ♥ *Make a gift in memory or celebration*
- ♥ *Host a fundraising event*
- ♥ *Purchase a ticket in 'Play for Purpose' (link on our website)*
- ♥ *Leave a gift in your Will*

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



Matthew's Heart Story



Qantas Pilot Matthew Gray trusted his gut instinct, narrowly avoiding a devastating start to the New Year. Being fit, of a good weight and having had regular medicals, heart disease was not on his radar for 2018.

A trip to North Shore Hospital with suspected heart issues was not quite the New Year Matthew had in mind on the 2nd of January 2018. Still in Christmas relaxation mode, Matthew headed into the office for a productive day at work with no meetings and the opportunity to get things done while it was still quiet. Leaving work at 4pm and deciding to get back into his pre-Christmas exercise regime Matthew headed to the beach for his usual work out. "I got down to the beach and frankly I was not feeling as refreshed as I normally do after walking for about 30 minutes". Continuing with his exercise, Matthew quotes "my arms started to feel heavy and I got this

dull ache between my shoulder blades. The arm heaviness was something I experienced before Christmas, but this was coming with shoulder blade pain. I stopped and had a think about this and thought it might be linked to the heavy lifting I did the day before." As the pain seemed to improve he continued his workout. When the pain started returning he checked his pulse, which was "steady and regular". Being fit, of a good weight and having had regular medicals Matthew thought it couldn't be a heart issue, surely! With no other 'typical' symptoms such as chest pain, jaw pain or arm pain Matthew continued and had no further issues throughout the rest of his workout.

Once home, Matthew states he was "feeling pretty good, but something was bothering me about the dull ache pain I had experienced." As this was unusual he did some research online. On reading that pain in the back between the shoulder blades can be a symptom of a heart attack Matthew realised he should take precautions and dialled 000 "somewhat apologetically" and within 4 minutes the ambulance arrived. The paramedics did an ECG and asked Matthew questions. With the ECG coming back perfect, the paramedics said they saw nothing to immediately alarm them but said Matthew

could go to hospital to get more definitive blood tests. "I sat for a moment and my instincts said get the check."

On arriving at North Shore Hospital, Matthew underwent several different tests with results varying and becoming unclear.

Stent treatments pioneered by Heart Research Australia have helped dramatically reduce death rates from Heart Attacks at Royal North Shore Hospital and are now standard practice.

The decision was made to keep him overnight with further tests to be done in the morning. On discussion with his cardiologist the next morning, it was decided to do a non-invasive test with a CAT scan to clearly show what condition his heart vessels were in. An hour after having this test, Matthew was in theatre having an angiogram with a team of 10 people surrounding him. The CAT scan had showed some blockages were evident and would shortly cause a heart attack. After having had the angiogram, Matthew had stents inserted to improve the blood flow to the heart muscle, relieve his symptoms and reduce

the chance of the blockage returning.

Watching the whole thing on the monitor Matthew saw the stents going in. He describes it as “painless but glad when it was over.” He states the entire team was thoroughly professional and made “a highly complex event look seamless.”

Matthew Gray was the recipient of ETAMI - Early Triage of Acute Myocardial Infarction (also known as early treatment in ambulances) and SALAMI - Stents as an Alternative to Lytic therapy in Acute Myocardial Infarction (stents used as an alternative to drug therapy). These treatments were available to Matthew due to research breakthroughs funded by Heart Research Australia thanks to the generosity of our wonderful donors.

The ECG machine that the paramedics used on Matthew assesses patients in the ambulance sending results directly to the hospital. This significantly reduces the time-lapse from onset of symptoms to surgery by more than 100 minutes. Heart Research Australia has funded 40 ambulances with these machines enabling doctors to treat patients like Matthew sooner, therefore saving heart muscle, which is crucial to longer-term quality of life. The stent Matthew had inserted to

“I did a few things right. I didn’t ignore the symptoms, I trusted my instinct and I called 000.”

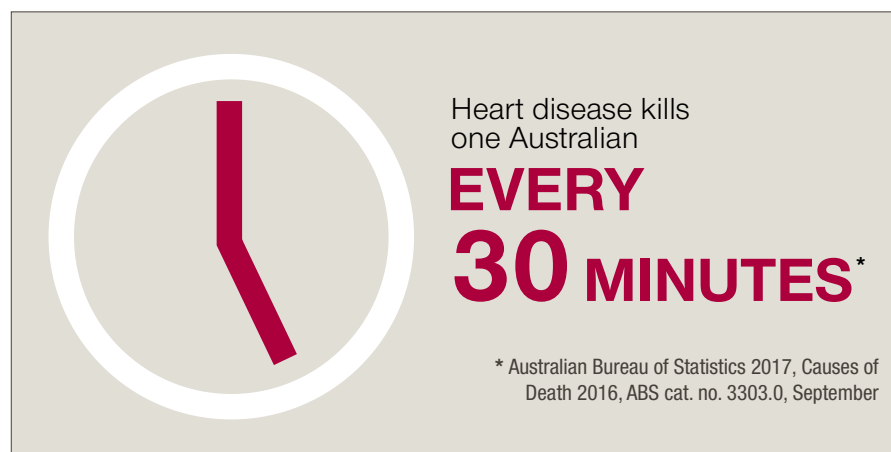
open the artery and allow blood to reach the heart is a treatment, pioneered by Heart Research Australia at Royal North Shore Hospital. It is an alternative to slow-acting, clot-busting drugs, which used to take time to work, and could cause serious complications. The stent procedure is a proven much safer and more effective treatment.

ETAMI and SALAMI used together have helped reduce death rates from heart attacks at Royal North Shore Hospital by 30% and is now standard practice today. Without the generous support of our donors, the ideas behind these lifesaving treatments may have stayed in someone’s notebook.

Matthew trusting his gut and being proactive helped save his heart from serious damage.

“I did a few things right. I didn’t ignore the symptoms, I trusted my instincts and I called 000. It is very easy to come up with another reason for the symptoms - put heart disease at the top of the list.” Matthew wants to dedicate his story to the NSW ambulance service, staff at the Royal North Shore Hospital and his colleagues. Matthews story is a result of several dedicated people listening, trusting the patient, and trusting their instincts ensuring Matthew received the urgent care he needed before a heart attack was imminent despite seemingly “perfect” initial tests.

The generosity of our donors towards the research projects culminating in the treatments used by Matthew has saved many lives. On behalf of Heart Research Australia, Matthew and the other recipients, we say thank you!



Our Heartfelt Thanks

Thank you for helping us to keep families together for longer

Without your support, we couldn't continue our fight to protect the people you love from heart disease. Your partners. Your parents. Your siblings. Your grandparents. Your closest friends. Because, at the end of the day, the long years of study by our researchers, the late nights in the lab, the relentless pursuit of knowledge and testing of hypotheses is all about one thing: giving more people more time with those they love.

Lloyd Walter Thomson
20/10/1916 -19/7/2018.



Lloyd Thomson was involved in the landmark SALAMI trial funded by Heart Research Australia in 2002, in which heart attack patients who presented at RNSH had their blocked arteries opened using new stent technology, rather than slower acting drugs.

"We are forever grateful for all the extra years we had with Lloyd, thanks to Dr Ward and your team of wonderful researchers"

Avis Ward, Lloyd's wife

While the success of the trial led to stent treatment becoming the gold standard for heart attack patients, for Lloyd Thomson's family, the trial's success could be measured by the sixteen additional years he was able to enjoy with his family and loved ones. Lloyd passed away in July 2018 at the age of 101.

Heart Research Australia seeks to end the devastation experienced by the 1.2 million¹ people in Australia living with cardiovascular disease, by investing in world-leading research, and ensuring the benefits of research breakthroughs are brought to patients as soon as possible.

We extend our heartfelt appreciation to all our supporters whose generosity bring us closer to this vision. Whether you volunteered your time, purchased a raffle ticket, held a morning tea, donated to our appeals or set up a monthly direct debit - you made a difference.

Giving heart to future generations

Beating heart disease takes incredible levels of investment, which is why we are so grateful to the men and women who help to make our research possible through a gift in their Will. Close to half of our vital research is funded in this very special way.

In the last financial year, Heart Research Australia was left over \$1,091,772 by ordinary Australians who made the important decision to remember us in their Will to say 'thank you' for the help they or a loved one have received in their lifetime, or to fund research that has the potential to protect those they leave behind.

But while 25% of Australians say that they would like to include a gift to charity in their Will, currently only 7.4% of Australians actually do². Any amount left as a bequest, be it large or small, can make a huge difference to Heart Research Australia. It enables you to leave a lasting statement of your generosity and care as well as being one of the most valuable ways to ensure we can continue our pioneering research well into the future.

¹ <http://www.health.gov.au/internet/main/publishing.nsf/content/chronic-cardio>

² Include A Charity <http://www.fpmagazine.com.au/many-australians-leave-gift-charity-will-new-research-359436/>

Trusts & Foundations

We are proud to bring so many people together in our mission to end heart disease and are particularly grateful to the following trusts and foundations who loyally support our work year on year:

The Lady Proud Foundation, The Mill House Foundation, Vonwiller Foundation, Emorgo Foundation, Skipper Jacobs Charitable Trust, EY Foundation, Lin Huddleston Charitable Foundation, Chatswood RSL Club (via the ClubGrants program).

Regular giving

HEART HEROES are an amazing group of dedicated supporters who donate monthly to ensure crucial first-stage research into heart disease continues.

The regular donations from these generous individuals not only provides a constant, reliable source of funding for our most innovative research projects, but it also gives us the ability to project the amount of resources available for new and exciting projects into the future.

With over 900 supporters making the wonderful decision to make monthly donations, we have seen tremendous growth in our Heart Hero program over the past year, greatly helping to accelerate the research that could lead to the next breakthrough in heart disease.

As well as welcoming new Heart Heroes, we would also like to acknowledge the regular givers who have been supporting us with monthly or quarterly gifts for many years.

Heart Heroes are the life-blood of Heart Research Australia and we are so incredibly grateful for all your support. Through your willingness to show your commitment via ongoing support, we can truly make medical breakthroughs in heart disease happen, and ultimately keep families together for longer.

Thank you



**73% of
Australians
aged 30 to 65
years have
at least one
risk factor for
heart disease.**

**SOURCE: National
Heart Foundation, 2017.
HeartWatch Survey,
customised data,
April 2018.**

Volunteers

We are so incredibly thankful and appreciative to the amazing volunteers who have helped Heart Research Australia this past year. The skills and time they have shared with us has been invaluable and we are so grateful. From assistance with website management, administration duties and fundraising events their support has been amazing, and we are just so thankful.

Carsten



“I chose to volunteer with Heart Research Australia as they looked at my skill set and found tasks I would find interesting and suitable given my previous work experience.”

Heart disease is a condition that can or will affect most of us either directly or indirectly, as is the case with me. My mother's side of the family has a history of heart disease; my grandfather suffered from a slowed heart rate, my uncle suffers from fast palpitations and my mother suffers from skipped beats and extra beats. I am still unaffected and will hopefully remain unaffected, but I see research into heart disease as a very

important and worthy cause. I used to work as an IT consultant but had to give up work for a few years because of Chronic Fatigue Syndrome. Volunteering was a good way for me to prepare myself for paid work while contributing to a cause that affects my family and is close to my heart. I looked at two different charity organisations when I decided to volunteer and one of my main reasons for choosing Heart Research Australia was

the fact that they looked at my skill set and tried to think of some tasks that I would find interesting and are suitable given my previous work experience. This has in turn benefitted Heart Research Australia and helped to improve my chances of returning to paid work, while giving me immense satisfaction volunteering and contributing towards a great cause.

Kritika Gupta



“It has been a great experience volunteering and I would highly recommend it to anyone wanting to lend a helping hand, at the same time, learning new skills and meeting great people.”

My husband and I moved to Sydney in September 2017. I had mostly been working from home but was left with some spare time, which I wanted to use gainfully. Volunteering seemed like a great fit as it not only helped me familiarise myself with the work culture here, but also allowed me the flexibility to decide my hours. While looking at different opportunities, I found out about

Heart Research Australia – an organisation committed to funding first stage research not supported by the Government. I also learned that heart disease kills three times more women than breast cancer! A meeting with those working at the organisation followed, where I learned more about what they were doing to make a difference. The cause as well as the people seemed

wonderful and I joined in April this year.

My work primarily involves researching on prizes that could be auctioned, thereby raising valuable funds for the organisation. Apart from being involved in fundraising, I work on Salesforce database and other tasks that might be of help to the staff.

Manisha Mali



It has been really wonderful to learn of the service that Heart Research Australia does for Australians and their devotion to heart health improvement. The fund-raising team with whom I

am working is very committed to improving the heart health of Australians through research and awareness. I feel honoured and lucky to be part of such an amazing workplace.

“I feel honoured and lucky to be part of such an amazing workplace.”

Corporate Supporters

Heart Research Australia is so thankful to the following corporate supporters and their staff for their significant support towards our cause. Their support contributes greatly to enabling the recruitment of the next generation of Australia's senior heart researchers; educating the public on symptoms of heart attacks and driving early diagnosis and prognosis.

Bayer Australia and Abbott Vascular

In 2017 Bayer Australia together with Abbott Vascular contributed to Heart Research Australia's Research Fellowships, enabling us to support two interventional PhD students. This program provides invaluable training, education and clinical experience for the next generation of talented heart scientists at Sydney's Royal North Shore Hospital.

Postgraduate researchers contribute significantly to the day-to-day research conducted into heart disease. The hope is that research at this level will be an important source of new and unexpected discovery. The support from organisations such as Bayer Australia and Abbott Vascular, enable us to recruit the most talented students, regardless of their financial circumstances, creating a critical mass of talent and expertise dedicated to defeating heart disease. In turn, these students reinvigorate and challenge their mentors and help to accelerate the pace of discovery, while also serving as role models for undergraduates.

The career path of the next generation of Australia's senior heart researchers may well begin with Heart Research Australia PhD scholarships and we thank Bayer Australia and Abbott Vascular for their support towards this.

"For over 120 years, Bayer has been researching and developing innovative medicines and new therapeutic approaches that help make a difference to people's lives. Continuing this commitment, Bayer is proud to collaborate with Heart Research Australia to support a specialised training program and provide Fellowships for two PhD students - nurturing the next generation of cardiac researchers."

*Eduardo Pimenta, MD, PhD, FAHA,
FESC, Associate Medical Director,
Bayer Australia/NZ*



Community Underwriters

Community Underwriters has contributed funds toward Heart Research Australia's Heart Smart pocket guides. These provide the public with information about assessing heart attack symptoms and what to do. Communicating this information drives further awareness of heart disease

and arms the public with the confidence to seek medical treatment or advice earlier. Improving early and accurate diagnosis of heart attack symptoms can ensure patients receive optimal treatment from the onset of symptoms. This can drastically reduce the severity of

the symptoms of a heart attack, the risk of a future heart attack and can improve survival.

This funding support has enabled us to share this message further helping to arm the public with knowledge and we are incredibly grateful.

Ormeggio & Chiosco

Alessandro and Anna Pavoni, owners of Ormeggio at the Spit and Chiosco donated their beautiful venue and contributed prizes towards our Directors' Dinner and Golf Charity Challenge in 2017/18. Donation of this venue and prizes enables us to significantly reduce the cost of a fundraising event to drive funding for research projects.

In addition to the generous donations from Alessandro & Anna, Alessandro is also an Ambassador and generous supporter of Heart Research Australia. We are incredibly grateful to both him and Anna for sharing their stories with us and helping support Heart Research Australia in so many ways.



Giving the gift of life at work

Heart Research Australia is indebted to the men and women who support our life-giving research by donating through their workplace giving programs. More Australians are embracing this tax-effective mode of regular giving by making a regular donation to Heart Research

Australia through their payroll from their pre-tax pay, thereby reducing their taxable income. In some instances, this donation is matched by their employers, thereby doubling the impact of the donation. Workplace or payroll giving is an easy and effective way to support

pioneering heart research. It provides a reliable income stream that allows us to more effectively fund lifesaving heart research aimed at finding new and better ways to prevent, diagnose and treat heart disease – Australia's biggest killer.

Highlights From The Year

Heart Research Australia's community of supporters are the heart and soul of the organisation. Through their heartfelt fundraising, we can continue to support our wonderful researchers and help nurture the next generation of young heart scientists.

As the type of research Heart Research Australia funds does not receive any government funding, we are 100% reliant on the generosity and passion of the community to support our dedicated researchers' work.

Together, the following annual events have raised a grand total of over \$74,000. We are extremely thankful for this amazing support.

Wear red day

Taking place on the day of hearts – Valentine's Day 14 February – Wear Red Day aims to not only raise awareness of heart disease, but also raises much needed funds for first-stage research. Schools, corporates and individuals wear something red for a gold coin donation to honour or remember someone close to them who has been affected by heart disease. Cardiovascular disease is the world's number one killer claiming 17.9 million lives in 2016* representing 31% of all global deaths. Now in its third year, Wear Red Day 2018 was supported by over 263 participants, ranging from individuals wanting to make a difference, to businesses supporting the heart health of their staff and creating a fun day in aid of helping us beat Australia's biggest killer.

18 Schools joined the red-wave,

with students wearing red socks, ties, hats or painted hearts on their cheeks for a gold coin donation and turning Valentine's Day truly into the day of hearts.



A heartfelt thank you to everyone who participated or contributed – you are helping to keep hearts beating for longer.



**World Health Organisation Cardiovascular Disease Fact Sheet*

Annual heart health lunch

Now in its 17th year, the Annual Heart Health Lunch is one of Heart Research Australia's most popular fundraising events. Organised by the Red and White Committee, the event raises much needed funds for life-saving heart research. Head of Cardiology at Royal North

Shore Hospital, Dr Greg Nelson and Dr Rebecca Kozor held an open panel discussion regarding the ever growing need to find new ways of diagnosing and treating heart disease, as they are seeing an increasing number of patients who have less than one risk factor for heart disease being treated for a heart attack. Former NSW Fire & Rescue Commissioner Greg Mullins was

one such patient, who shared his emotional journey of experiencing a heart attack, even though he was at the peak of his fitness and had no risk factors. Held at the Deckhouse Restaurant in Woolwich each year, this annual luncheon is a firm favourite on our fundraising calendar and raised nearly \$32,000 through donations, raffles and ticket sales in 2018.

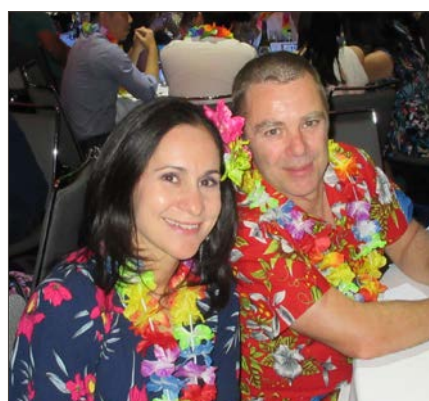


Charity challenge gala dinner

As a benefiting charity from the Charity Challenge Golf Series, Heart Research Australia is fortunate to be a beneficiary from

the annual Charity Challenge Gala Dinner held every year to help raise funds for the charities on the Series.

Last year Heart Research Australia received nearly \$10,000 from this event.



Red heart rugby day

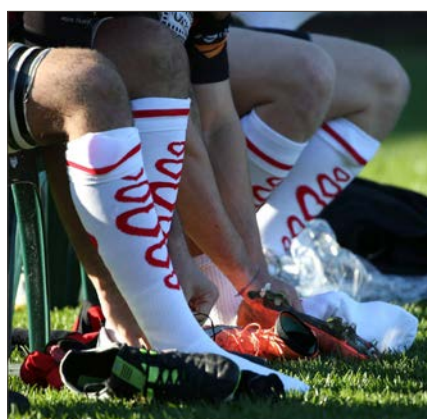
In 2012 Norths Rugby joined forces with Heart Research Australia as an official community partner, to help raise awareness about the importance of heart health for all Australians.

Through this joint initiative, Norths and Heart Research Australia are working together to raise much needed funds for innovative new research into heart disease.

This event takes place each year at North Sydney Oval, with players from the 1st to the 4th grade wearing specially designed heart socks highlighting their commitment to heart health.

The Red Heart Rugby Day demonstrates the importance of combining sporting communities with heart health awareness.

Thank you to Jack Burey, General Manager of Norths Rugby for his continued support in helping to make this a fun day for all involved.



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
- Goes towards the funding of world-class medical equipment
- Contributes to building and implementing research projects dedicated to exploring new ways of protecting Australia's hearts
- Supports two Chairs of Cardiology and the next generation of researchers.

Charity challenge golf day

Heart Research Australia is very fortunate to be part of The Charity Challenge Golf Series, run by Gary Dawson OAM and Matthew Laverty, through the support from former Board Member Paul Allison.

Our annual Golf Day has forged many great friendships and business relationships over the years and has become a part of many Corporate golfing calendars, with senior executives of large organisations using this day as an ideal networking opportunity, as well as raising



money for heart research. Long Reef Golf Club hosts this annual event, not only offering a fantastic round of golf, and a refreshing luncheon, but participants also have the opportunity to hear about the



latest research being supported by Heart Research Australia. This event raised funds through golf day entries, raffles and auctions. Thank you for your continued support – it is greatly appreciated.



Our Research

Keeping families together for longer through life-saving heart research

Our research funding portfolio is focused on identifying new ways to prevent, treat and diagnose heart disease, which remains the leading single cause of death in Australia.

This report features the many inspiring projects our researchers are working on, from finding a potential new life-saving treatment for heart failure, to identifying ways of helping patients better prepare and understand their condition and follow-up after being discharged from hospital.



Why research is important

Heart disease kills one Australian every 30 minutes*. Despite major advances in the understanding and treatment of heart disease, there remains a large gap in our knowledge, particularly of the recent changes coming through from latest statistics. There is an increasing number of people who are looking up from the operating table saying, 'why me doc?' The proportion of patients with no

risk factors coming through North Shore Hospital's Catheter lab for a stent, have increased from 11% to 27% over the last few years. Research is critical in understanding heart disease and helping to reduce these devastating statistics.

**Australian Bureau of Statistics 2017, Causes of Death 2016,
ABS cat. no. 3303.0, September.*

Research Projects

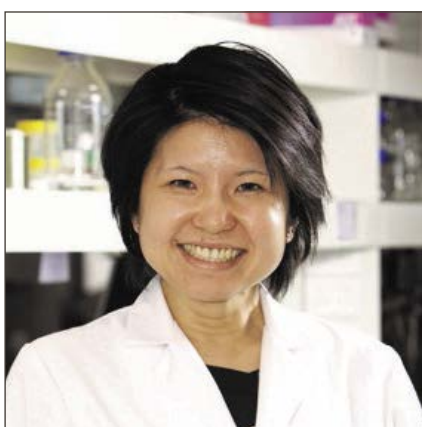
Chair of Cardiology - Professor Helge Rasmussen



Professor Helge Rasmussen is the Chair of Cardiology. He divides his time between working as an interventional cardiologist and leading a team of researchers in molecular and cellular medicine. A particular focus of his research is learning how heart cells work, which has led to discoveries that could mean better treatment for heart failure and other forms of cardiovascular disease.

Professor Rasmussen's work covers understanding the regulation of the cardiac Na⁺-K⁺ pump and the development and implementation of primary percutaneous coronary intervention in ST elevation myocardial infarction in Australia. His basic science research has led to paradigm shifts in the understanding of the Na⁺-K⁺ pump, and his clinical work in the cardiac catheter laboratory has led to a change of practice for patients with myocardial infarction.

A novel combination for heart failure



Dr Chia-Chi Liu

Project Title:

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

Lead Researchers:

Prof Helge Rasmussen,
Dr Chia-Chi Liu,
Dr Elisha Hamilton

Funded Since: 2014

Amount: \$150, 000 over 3 years

With trials underway, this innovative treatment has huge potential for over half a million Australians who are currently suffering from heart failure.

Their research has found that administering β 3-AR agonists can reduce sodium overload in heart muscle cells and decrease oxidative stress in heart failure. They have also studied this drug as an add-on to standard therapy in 70 patients with heart failure for 6 months, and results showed that the treatment is safe, and the condition of patients' hearts is improved, in some cases, significantly. Additional clinical trials for patients with severe heart failure are in progress.



Dr Elisha Hamilton

Heart failure is the leading cause of health complications and death in the world. While many drugs are used in the treatment of heart failure, this innovative research has discovered that a new group of drugs, β 3-AR agonists (one of which is already used as a treatment for an overactive bladder), are beneficial for heart failure treatment.

Prevention of cardiac side effects of cancer treatment

Project Title:

Prevention of anthracycline induced cardiomyopathy

Lead Researchers:

Prof Helge Rasmussen,
Dr Chia-Chi Liu

Funded Since: 2016

Amount: \$50,000

Recent results are very promising and reflect what was discovered in test tube studies.

Heart muscle damage and heart failure is a serious side effect of cancer treatments. It is not uncommon that the life expectancy of cancer patients is limited due to heart disease induced by the cancer treatment, rather than by the cancer itself. While very effective against many cancers, particular drugs can cause heart failure, and the risk increases as the total dose increases.

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

The objective of Dr Liu and Professor Rasmussen's project is

to reduce the size of the cancer-killing molecule and refine its properties, and test if it can reduce or eliminate the risk of heart failure induced by cancer treatment drugs, without decreasing the effectiveness of the drug in treating the cancer. The team's test tube studies have found that the effectiveness of chemotherapy was increased nearly tenfold when the peptide they have developed was applied to the cancer cells.

After successful tests on cells, the team are now testing the application of the peptide to tumours in mice with the objective of progressing towards human trials. The recent results from animal studies are very promising and reflect what they had discovered in the test-tube studies.



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

Project Title:

Enzymatic Redox regulation of the Na⁺ pump

Lead Researchers:

Prof Helge Rasmussen,
Dr Chia-Chi Liu.

Funded Since: 2014

Amount: \$150, 000 over 3 years

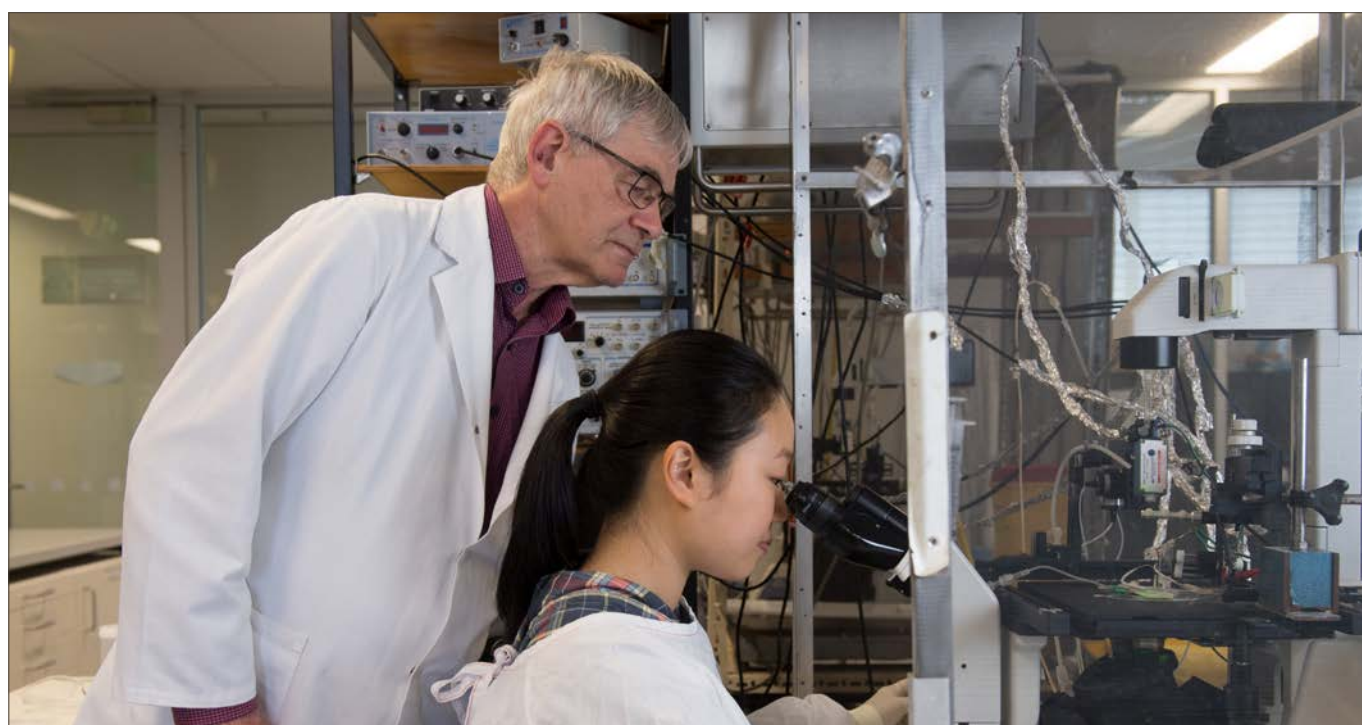
The membrane sodium pump is one of nature's fundamentally most important molecules. Its molecular structure is now well defined, as is the way it pumps sodium and potassium. However, how its activity is increased or decreased in response to changing needs has been highly controversial.

Professor Rasmussen previously understood how glutathionylation can inhibit the pump. He now also understands how a decrease in glutathionylation via cell signalling can stimulate the pump.

On a broader level, his studies also detract from the widely held belief that 'antioxidants' (e.g. in wine or vitamin pills) are

Results from this study have the potential to benefit sufferers of diabetes as well as heart failure.

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.



Research Projects

Chair of Epidemiology – Professor Geoffrey Tofler



Professor Tofler is currently working on several research projects with the potential to increase understanding of heart disease and its causes. His research focuses on three main areas:

First, investigating new approaches for prevention of heart disease focusing on acute triggers of a heart attack and their prevention;

Second, investigating the role of thrombotic (clotting) risk factors for cardiovascular disease.

Third, optimising the care of patients with heart failure from the hospital to the community.

Professor Tofler's work emphasises national and international collaborations and ensures the inclusion of students and junior medical and nursing researchers. At the August 2018 Annual Conference of the Cardiac Society of Australia and New Zealand, Professor Tofler was senior investigator on two presentations delivered by two junior doctors Dr Nelson Wang - Heart Rate during the Post-Discharge home visit predicts mortality in patients with Heart Failure; and Dr Lorcan Ruane - Triggering of Acute Myocardial Infarction by a heavy meal. In addition, Professor Tofler gave an invited talk entitled "Pollution and Environment: The New Trigger" at the Cardiac Society conference as well as a Cardiac Rehabilitation Scientific Meeting.

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

Project Title:

TARP (Triggered Acute Risk Prevention) study

Lead Researchers:

Prof Geoffrey Tofler,
A/Prof Thomas Buckley

Professor Tofler's team have finished data completion and are currently completing a manuscript (TARP 3) for submission to a journal. The data, which has been presented as a poster at a prior CSANZ conference, demonstrates that patients with known heart disease or risk factors can feasibly take medication for potential triggers, with positive trends towards improved self-mastery. This work, which was funded by a grant from Heart

Research Australia, provides the springboard for the preparation of a protocol for a large multicentre and international trial (TARP 4) to submit for funding. They are currently in discussion with Monash University Epidemiology (Professors John McNeil, Andrew Tonkin), and overseas collaborators.

Patient directed discharge letter

Project Title: PADDLE (Patient Directed Discharge Letter)	Professor Tofler and his team have received a Northern Sydney innovation grant to implement 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 ongoing project has generated significant interest from NSW health and beyond, with an exciting potential to improve health care. The project is currently short listed for an additional grant.
Lead Researchers: Prof Geoffrey Tofler		

Cardiovascular risk reduction in bereavement

Project Title: CARBER (Cardiovascular Risk Reduction in Bereavement)	The results for this study, which was supported by a grant from Heart Research Australia, show that low dose beta-blocker and aspirin have a beneficial effect on cardiovascular risk factors in early bereavement. The main manuscript will be shortly	submitted, with plans for follow-up manuscripts. The results were previously presented at the American Heart Association conference, and CSANZ conference (it won a prize at 2017 CSANZ).
Lead Researchers: Prof Geoffrey Tofler, A/Prof Thomas Buckley		

Smoking cessation through personal identification

Project Title: SCUPI (Smoking Cessation through Personal Identification)	This novel approach to smoking cessation, which is supported by a grant from Heart Research Australia and a SPARK innovation award, uses video to create a simulated teachable moment – and builds on the clinical observation that many smokers can stop smoking once they have experienced a heart attack. The goal of this project, which has been extended to an internet /	telehealth version is to use this information to assist people to stop smoking prior to any heart disease.
Lead Researchers: Prof Geoffrey Tofler		This project has been accepted for publication in the Journal of Smoking Cessation, and will stimulate a wider implementation, including in the challenging group of smokers with a smoking partner.

TAMAMI (Triggers and Modifiers of Acute Myocardial Infarction [AMI])

Detailed information on triggers and their modifiers has been obtained on 850 patients hospitalised at RNSH with AMI. This information is currently being analysed.

“Physical exertion as a trigger of AMI” is a manuscript currently under journal review, and 2 further manuscripts are being prepared for submission:

“Heavy Meals as a trigger” was presented as a poster at CSANZ 2018,
“Work Stress as a trigger” (previously CSANZ abstract, was shortlisted for a prize)

HOSFAM (Evaluation of the effect of Hospitalisation on Family members and their psychological, behavioural and physiological risk factors).

This ongoing study is proceeding well. Monica Ruckholdt is conducting her PhD on this

project (she received support from Heart Research Australia). Assoc Prof Tom Buckley is the

senior supervisor, and Geoffrey Tofler is co-supervisor.

Framingham heart study collaboration

This ongoing international collaboration with Framingham, Massachusetts, investigated the role of Haemostatic Risk Factors, and Genetic Determinants, in Cardiovascular Risk Prediction. The collaboration also links Professor Tofler with other

international program consortia. Recent manuscripts include a 2018 publication in Journal of American Heart Association: *“ADP Platelet Hyperreactivity Predicts Cardiovascular Disease in the Framingham Heart Study”*, and a paper currently

under review: *“A genome-wide association study identifies new loci for Factor VII and implicates Factor VII in ischemic stroke etiology”*. Five additional manuscripts are in preparation.

MACARF (Management of Cardiac Failure):

Professor Tofler is the 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 2

recent publications (predictors of frequent readmissions in heart failure, and characterisation of heart failure with mid-range and preserved ejection fraction), with a 3rd manuscript on

temporal changes in heart failure characteristics and outcome, currently undergoing revisions. An abstract on heart rate in heart failure was presented as a mini-oral at CSANZ 2018.

Other projects:

Professor Tofler is also leading two student MD projects:

DETRACT STUDY (comparing Direct Oral Anticoagulants versus traditional Anticoagulants in patients with Atrial Fibrillation and Flutter undergoing Transoesophageal Echocardiography for Cardioversion).

In addition, Professor Tofler is a coinvestigator on an NHMRC project (the Optimise study, for aspirin use), an NHMRC grant submission "Evaluating the effectiveness of innovative avatar technology on reducing prehospital delay for chest pain." and the MYHEARTMATE study:

trialling a game-based app to promote behaviour change in patients with CVD. As medical director of the North Shore Cardiac rehabilitation service, Geoffrey encourages and supports clinical research from the rehabilitation service based on the patient characteristics and excellent outcomes.

MAFACARI (Masters Football and Cardiovascular Risk)

This project is based on a questionnaire for footballers (soccer) aged >35 years assessing knowledge of their cardiac risk, warning symptom recognition, and support of measures such as defibrillators. Currently, there has been little work done investigating this group of individuals. With the recent World Cup, and publicised individual instances of cardiac arrest among footballers, this project once analysed and published, will likely have interest and clinical benefit.



Risk factors for heart attack and heart failure

1. Heart Foundation. HeartWatch Survey 2016. 2. Australian Bureau of Statistics. Australian Health Survey 2011/12.

Discovery of new mechanisms for coronary disease

Project Title:

Discovering new mechanisms and therapeutic targets for coronary disease and protection against heart attack.

Lead Researchers:

Prof Gemma Figtree

Co-Investigator: Dr Kristen Bubb

Funded Since: 2017

Amount: \$35,750



Cardiovascular disease is the leading cause of death in Australia. Despite major advances in the understanding and treatment of heart disease, there remains a large gap in our knowledge of what drives this. Professor Figtree's team have established a large cohort study of patients who are at risk or suffering from coronary artery disease. Patients volunteer, and consent to contribute a blood sample and their de-identified data to the study, allowing us to study new mechanisms of coronary artery disease. The team is particularly interested in comparing novel markers (genomic, metabolomic, inflammatory) in people with

extensive coronary disease explained by traditional risk factors, against those who have extensive disease that is not explained by traditional risk factors. They have studied almost 700 patients presenting with life threatening heart attacks to Royal North Shore Hospital, looking particularly at the percentage of patients who have no risk factors and effectively look up from the operating table to say, "Why me doc?". Over the last decade this percentage has increased from 11% to 27%, independent of age or sex, which highlights the need for ongoing efforts to unravel the "missing" biology of coronary disease.



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

Project Title:

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

Lead Researchers:

Prof Gemma Figtree

Co-Investigators:

Prof Kathy Sweadner,

Prof Richard Cohen,

Dr Ben Davies, Dr Chris Bursill

Funded Since: 2014

Amount: \$150,000 over 3 years

This project grant has supported a post-doctoral researcher, and the cost of research equipment, which is focussed on understanding the mechanism by which elevated levels of oxidative stress inhibit a key membrane protein and how the resulting cellular changes have an effect on blood vessel function. The molecular signalling pathways involved have been delineated in cellular models, and then examined in vivo in genetically modified models. From this work we have identified an endogenous protective mechanism in the microscopic signalling compartment that this protein resides in. We are currently working on delivery mechanisms of peptides derived from this. Given oxidative signalling 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 the National Health and Medical Research Council.

Women are almost three times as likely to die from heart disease than breast cancer.

SOURCE: (AIHW) Women and heart disease: cardiovascular profile of women in Australia (full report, 1 Jun 2010).





Detecting vulnerable plaque contributing to heart disease

Project Title:

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

Lead Researchers:

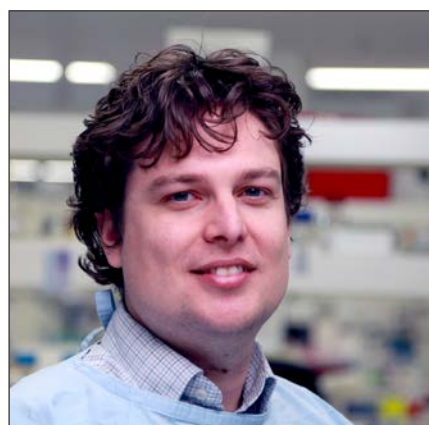
Dr Paul Bonnitcha

Co-Researchers:

Prof Gemma Figtree,
A/Prof Stuart Grieve,
Dr Elizabeth New

Funded Since: 2014

Amount: \$126,750



Hardening of the arteries and the formation of fatty plaques lining them are major contributors to stroke, heart attack and peripheral vascular disease.

Currently there is no way of knowing which plaques are most likely to rupture and cause problems. Recent findings indicate that plaque instability may be related to low oxygen levels within them, so a key aim of Dr Bonnitcha's research is to develop ways to detect these vulnerable plaques.

During his project, Dr Bonnitcha has 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. He is currently doing work in cellular and biological models to identify

whether different metal agent behaviours are maintained in more complex systems. In addition, Dr Bonnitcha has received ethics and governance approval to pursue a clinical trial that examines the uptake of radiotracers that sense low oxygen levels in the plaques of patients who have had strokes. Dr Bonnitcha's research has been presented at numerous conferences and has published 3 articles and one review related to his work. He was also invited to attend the Integrated Medical Imaging in Cardiovascular Diseases Conference in Vienna. His research group has just been granted approval to use the tracer "FMISO" in a clinical trial at Royal North Shore Hospital and they will begin to recruit stroke patients for imaging in early 2019.

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

Project Title:

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

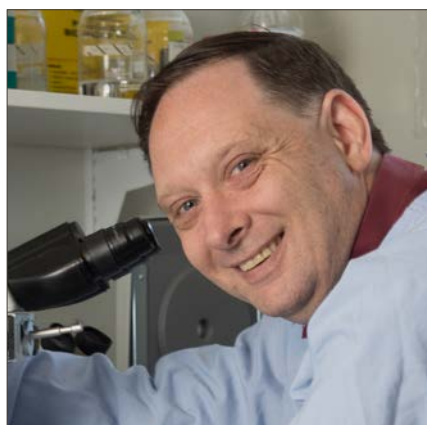
Lead Researchers:

Dr Anthony Ashton.

Funded By:

Anonymous Trust & Foundation

Amount: \$150, 000



“The ultimate goal of our research is to ensure a complication free pregnancy for every mother and the healthy delivery of all babies in our care.”

Most pregnancies end with the birth of a healthy baby to a healthy mother; however, some pregnancies end in unforeseen and currently untreatable complications. Unfortunately, the signs something is wrong in these pregnancies are “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 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 as there are no effective interventions to treat, prevent or diagnose it. Pre-eclampsia 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 6 months following it.

In fact, more than 50% 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 the 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. The critical insight has 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” to become the first prototype agent for curing pre-eclampsia. Dr Ashton has also created links 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 while others don’t. These findings will continue to unravel the mysteries of these two conditions and provide opportunities for development of new diagnostics for early detection of both conditions. The team is embracing new and exciting technologies in the pathology lab allowing them to tailor treatments to each individual pregnancy so treatment can start earlier and address the specific needs of each mother.

Developing 3D bioprinted personalized ‘replacement parts’ for heart attack patients.

Project Title:

Developing 3D bioprinted personalized ‘replacement parts’ for heart attack patients

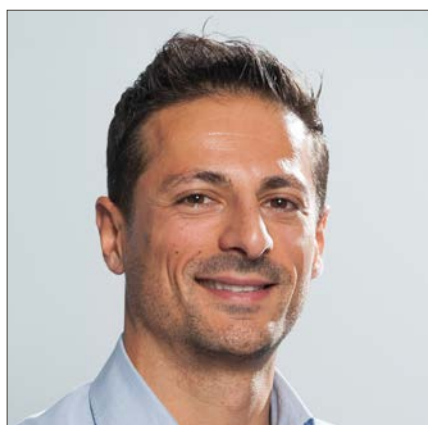
Lead Researchers:

Dr Carmine Gentile.

Funded Since:

2017 by the Millhouse Foundation

Amount: \$66, 000



“This research could lead to the creation of 3D bioprinted human heart tissues for transplantation, which would be life-saving for those in need of a transplant.”

Dr Carmine’s research involves working closely with cardiologists and cardiac surgeons to identify the best way to provide 3D bioprinted heart tissue for a patient who has suffered a heart attack. Cells from the patient’s skin and blood are used to produce stem cells. These are then cultured to produce heart cells by Dr Gentile and his team. The patient’s own heart cells can then be used as ‘bio-ink’ in the 3D bioprinter.

Dr Gentile and his team refer to this type of bio-ink as ‘mini-hearts’ (as they beat in a similar way to real human heart tissue). The ‘bio-ink’ is loaded into the nozzle of the 3D bio-printer, which deposits (‘prints’) the cells layer-by-layer within a bio-compatible paper (or ‘hydrogel’).

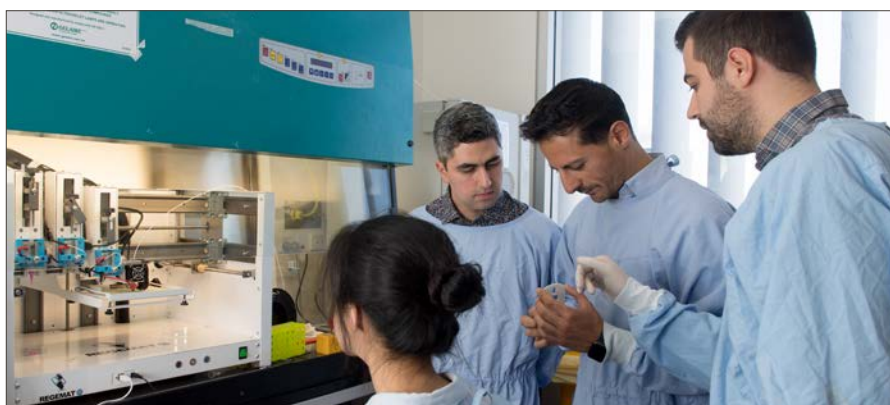
These printed cells form a ‘patch’ which could then be used to replace the damaged tissue. The unique combination of skills in Dr Gentile’s team,

which includes cardiac surgeons and cardiologists, biologists and bioengineers, is currently investigating the best approach to transplant the bio-printed patch to improve the heart function in heart attack patients.

Carmine hopes his research could lead to the creation of 3D bioprinted human heart tissues for transplantation, which would be life-saving for those in need of a transplant.

“Research is very costly, and securing funding is becoming increasingly competitive. Receiving funding from organisations, such as Heart Research Australia, is therefore critical for our research, and my team and I are extremely grateful for any support we receive from Heart Research Australia’s supporters.”

- Dr Carmine Gentile



Salary Support

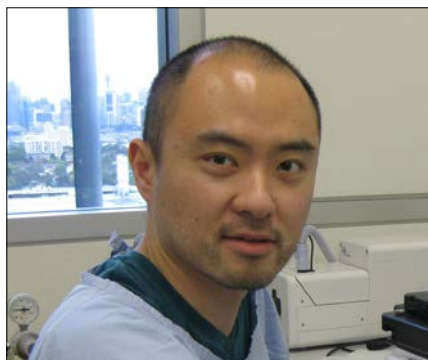
Heart Research Australia's salary support programme enables research assistants to support key investigative work and routine aspects that support the research process. This enables our high-level researchers to focus more of their time on research.



Dr Elisha Hamilton

Laboratory Manager for Professor Helge Rasmussen

Dr Hamilton is directly responsible for performing many of the experiments that are conducted within Prof Rasmussen's laboratory as well as providing a supervisory role to both students and research assistants within the lab. Her role as Laboratory Manager requires that she balances the scientific needs of the laboratory staff and students with the business needs of the lab. Her duties range from maintaining laboratory equipment, purchasing supplies, data management, budgeting, training and liaising with collaborators. In addition, Dr Hamilton performs many academic administrative duties including work health and safety representation, as well as the preparation and submission of the following; applications to funding bodies, scientific manuscripts for publication and applications for ethics approval.



Owen Tang

Laboratory Manager for Professor Gemma Figtree

Professor Figtree's Laboratory strives to understand the way reactive oxygen species affect disease in the heart and blood vessels. Oxidative stress is a major driver of cellular dysfunction leading to cardiovascular disease. Owen Tang is studying these molecular mechanisms and testing different ways to prevent it.

As a by-product of Owen's project, a novel probe which can effectively measure the membrane redox potential has also been developed by the team. The probe allows them to detect reactions in the cell that show if the processes they are targeting are being affected. This probe can potentially be used in different studies within the research group or by other teams.

Owen is also responsible for the management of the laboratory. As understanding of the disease has broadened the lab has grown significantly. Owen ensures the effective running of the lab by implementing WHS protocols, overseeing procurement of consumables and training of all new team members on PC2 environment.



Yan Chen

Research Nurse for Professor Martin Kluckow

The Mill House Foundation has provided continuous support for almost 15 years for a part-time Research Nurse to assist in Professor Kluckow's research. This position helps Prof. Kluckow develop and conduct new clinical studies in his quest to understand the problems with heart function in premature and sick infants receiving intensive care at Royal North Shore Hospital and in several collaborating hospitals around Australia. Yan Chen has been in the position since February 2016 and brings with her skills in data management and clinical trials coordination. Her role is worked in closely with the Newborn Care Centre staff to assist in the conduct of several ongoing and new projects in 2017-8.

1] APTS (Australian Placental Transfusion Study), the first results of this trial were published in the New England Journal of Medicine showing that delayed cord clamping can reduce mortality in preterm infants and is safe to apply. The follow up of the trial is ongoing and Yan Chen will continue to be involved in tracking these families to examine whether this intervention has long term benefits for those premature babies.

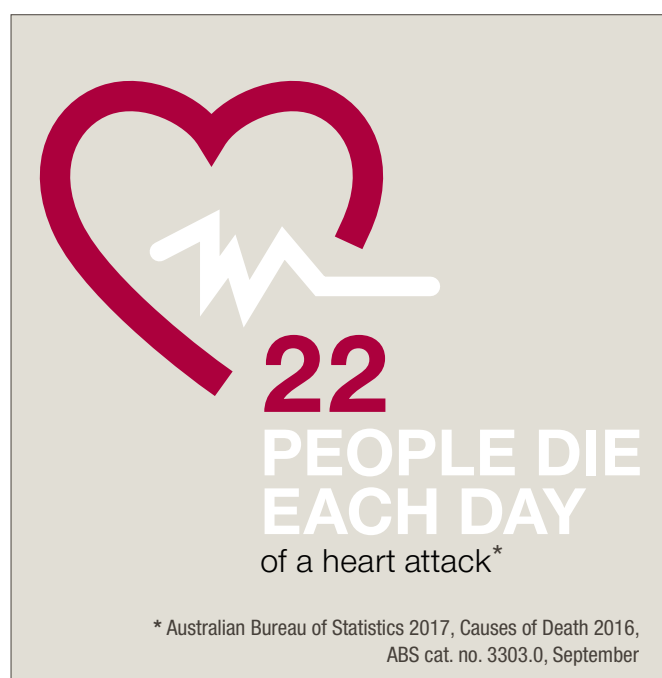
2] u-PDA Trial (Ultimate PDA Trial), a pilot trial of medical treatment to close the PDA versus supportive care alone. This placebo controlled clinical trial will for the first time target early treatment of the patent ductus arteriosus (PDA) in a state-of-the-art clinical trial design that will allow reviewing the real natural history of treated and untreated PDA's. This major new trial has now commenced at two sites – Royal North Shore Hospital and John Hunter Hospital and has enrolled over 60 infants so far.

All these studies are dependent on the access to a state-of-the-art ultrasound machine, donated by Heart Research Australia and the Mill House Foundation to Royal North Shore Hospital's intensive care unit. Besides the main research projects of cardiac function mentioned above, Yan Chen will help with several other important non-cardiac projects in Newborn Care Centre, including a project providing a new medication to babies who have suffered oxygen deprivation at birth and a new way of preventing infection in preterm infants.

Keeping Hearts Beating

Heart Research Australia's researchers are constantly working towards our vision of making breakthroughs in heart disease happen. The hope is a world free from heart disease, however the reality is that 4.2 million Australians* are affected by with this insidious disease. To support them and their families, we are passionate about spreading heart health messages to ensure every Australian has access to the best information and support.

Your journey to heart health starts here.



The Heart Smart Club

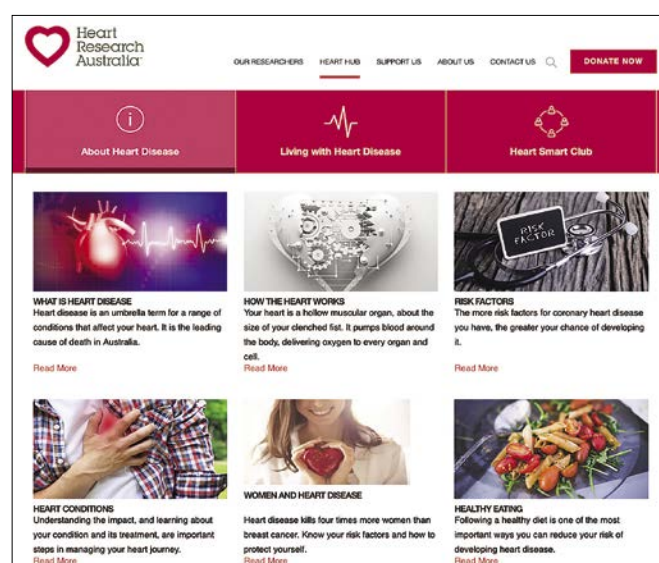
The Heart Smart Club provides members with information on how to maintain a heart healthy lifestyle, including access to online webinars, covering a range of topics focused on the prevention and treatment of heart disease, presented by our team of leading cardiologists and researchers. Members also receive regular e-newsletters, which include research updates, heart healthy recipes, information about different heart conditions and stories from people who are fighting heart disease and how they are coping with this life-changing adjustment.

To join our Heart Smart Club simply visit heartresearch.com.au/heart-smart-club

The Heart Hub

The Heart Hub 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.

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



* Australian Bureau of statistics, 2016, National Health Survey: First results, 2014-15, ABS cat. no. 4364.0.55.001, March.

Matters of the heart cardiac series

Discovering you have a heart condition can have a significant effect on you and your loved ones socially, physically and emotionally. Understanding the impact, and learning about your condition and its treatment, is important to come to terms with this significant event.

As part of our patient engagement program, we have started to produce a series of informational videos, with the aim of providing cardiac patients, their families and the wider community with helpful information. The series covers the most common heart procedures, information on the latest cardiac research, personal stories from heart survivors and the importance of rehabilitation. The videos are available on our website and offered for use in doctor rooms and hospital TV channels. Topics in the series include; About Angiography, What is a Heart Attack, The Importance of Cardiac Rehabilitation; with upcoming topics including All About Valves, What is a Diagnostic Electrophysiology Study, and Device Therapy for Arrhythmia and Pacemakers.



To view the Matters of the Heart episodes, please visit heartresearch.com.au/video

Heart Smart pocket guide

In December 2016, we developed the Heart Smart Pocket Guide, a compact, wallet-sized fold-out guide to heart attack symptoms, an action plan and risk factors. We initially distributed around 7,500 to our existing donors and supporters, and now offer the pocket guides to the wider community via Social Media. We have been overwhelmed by the personal stories hundreds of people have shared with us because of the pocket guide. Sadly, too many people have lost a loved one to a heart attack simply because they were unaware of the symptoms, and often, in the absence of chest pain they mistook the warning signs for heartburn, stress or another illness.

We aim for the pocket guide to help people be more aware of the full range of symptoms of a heart attack and encourage them to seek medical attention if they are ever in doubt.

No family should go through the tragedy of losing a loved one so unexpectedly to a heart attack, and we hope the pocket guide might play a small role in preventing such heartache.

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



Financials

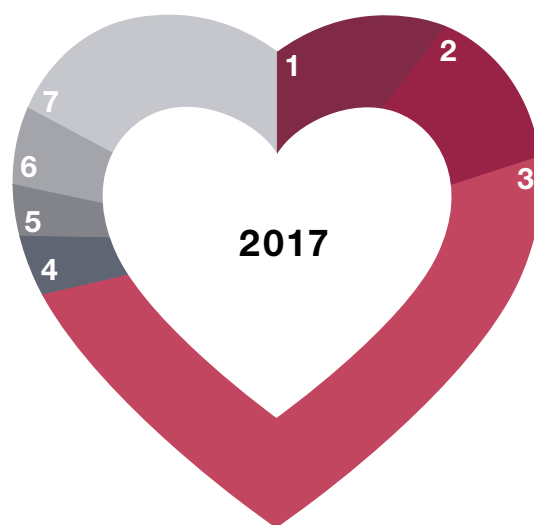
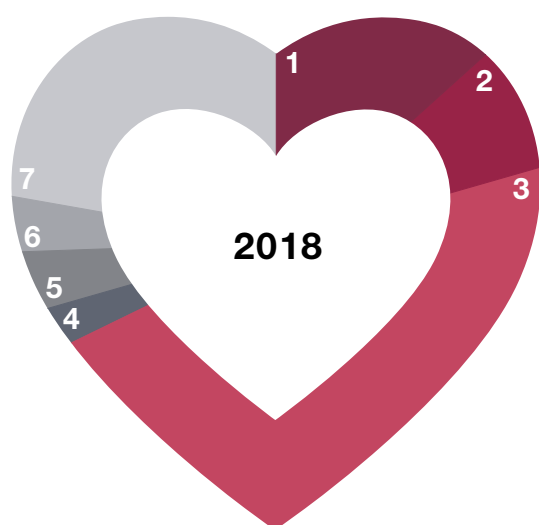
Heart Research Australia supports a centre of excellence that attracts world-class and emerging researchers to conduct ground breaking research into the prevention, diagnosis and treatment of heart disease.

We are extremely proud to have contributed over \$31.5M to heart research over the past 31 years, helping combat 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, it is necessary 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 1 the plan is in on track and has provided additional income of \$108k. Over 10 years it is forecast to provide an additional \$3.6M of revenue for research and ensure the long-term viability of the organisation. For every \$1 invested in the current regular giving program the current return is \$1.73.

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



2018

13.60%

7.05%

47.13%

2.84%

3.96%

3.44%

21.97%

1 Appeals

2 Raffles

3 Bequests

4 Corporate

5 Corporate in kind

6 Community

7 Other donations

2017

10.63%

9.70%

51.47%

3.87%

2.92%

4.70%

16.72%

Income	2018	2017
Fundraising activities	2,316,713	3,762,814
<i>Appeals</i>	314,961	399,870
<i>Raffles</i>	163,432	365,112
<i>Bequests</i>	1,091,772	1,936,780
<i>Corporate</i>	65,901	145,441
<i>Corporate In Kind</i>	91,836	109,809
<i>Community</i>	79,763	176,719
<i>Other Donations</i>	508,943	627,916
<i>Merchandise</i>	105	1,167
Non-operative activities	116,287	136,634
Total income	2,433,000	3,899,448

Expenses	2018	2017
Employee costs	813,158	737,383
Fundraising	780,671	819,657
Administration	191,140	201,083
Corporate In Kind	91,836	109,809
Research support	666,025	1,486,633
Total expenses	2,542,830	3,354,565
Net surplus/(deficit)	(109,830)	544,883

Assets and Liabilities	2018	2017
Cash and cash equivalents	962,382	998,195
Trade and other receivables	327,811	233,175
Financial investments	1,084,893	1,060,681
Plant and equipment	18,992	18,629
Intangibles	35,150	71,723
Inventory for distribution	38,986	50,848
Total assets	2,468,214	2,433,251
Trade and other payables	423,007	328,134
Provisions	58,489	8,569
Total liabilities	481,496	336,703
Net Assets	1,986,718	2,096,548

Our Governance

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 (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

DEPUTY CHAIRS

Michael Lawrence
BEC, SF Fin, MAICD, Harvard
Executive Program
CEO, Customer Owned Banking
Association

Associate Professor

Gregory Nelson
MBBS, FRACP, FCSANZ. Head,
Department of Cardiology, Royal
North Shore Hospital Consultant
Cardiologist

HONORARY TREASURER

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
Consultant and Non-invasive
Imaging Cardiologist Director,
Rapid Access Chest Pain Clinic,
Royal North Shore Hospital Co-
Director, Advanced Cardiovascular
Imaging Laboratory
Senior Lecturer, Sydney Medical
School, University of Sydney

EMERITUS DIRECTOR

Dr Gaston Bauer AM,
MD, BS, FRACP, FACC

DIRECTORS

Professor Ravinay Bhindi
MBBS (USyd), MSc (Oxon), PhD
(USyd), FRACP, FCSANZ, FESC
Professor, University of Sydney
Consultant and Interventional
Cardiologist

Charlie Frew OAM,
MPH/MIPH (UNSW) Managing
Director, CodeClean Australia/
New Zealand

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

Brigid K. Shute

Grad Dip. ProfMktg
Chief Executive Officer, Anon
Labs Pty Ltd

Anthony Thirlwell OAM,

FAICD, BSC(Hons), MBA
Director, Wentworth Healthcare
Ltd,
Previously CEO National Heart
Foundation of Australia (NSW)

Dr Michael Ward

MBBS (Hons), FRACP, PhD, DDU,
FCSANZ
Director, Cardiac Catheterization
Laboratories, Royal North Shore
Hospital & North Shore Private
Hospital;
Consultant & Interventional
Cardiologist

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

BOARD MEMBERS

Tony Crawford,
Dominic May,
Brigid Shute,
A/Prof Greg Nelson

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

BOARD MEMBERS

Professor Ravinay Bhindi,
Professor Levon Khachigian

EXTERNAL MEMBERS

Dr Christina Bursill
Immunobiology Group Leader,
Heart Research Institute

Professor Ben Freedman

Deputy Director Research
Strategy, Heart Research
Institute/Charles Perkins Centre
Professor of Cardiology, Sydney
Medical School,
University of Sydney
Head Vascular Biology Anzac
Research Institute

Professor Carolyn Sue

Professor and Director of
Neurogenetics
Interim Director, Kolling Institute
of Medical Research, University
of Sydney

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 activities are consistent with best practice for the sector.

Honours Board

Heart Research Australia supports world-class and emerging researchers to turn their innovative ‘out of the notebook’ ideas into reality. With the government not funding this type of first-stage research, Heart Research Australia is totally dependent on the community to help our researchers in their quest for major break-throughs in Heart Disease. We would like to recognise the incredible generosity of the following individuals and organisations who have contributed significantly to help keep families together for longer.

Significant benefactors \$10,000 and over

Anonymous (1)
Ian Bersten
Yvonne & John Almgren AM

Significant benefactors \$5,000 and over

Anita McKenzie
Lesley James
Richard Small
Tony McCormick

Significant benefactors \$1,000 and over

Anonymous (10)
Anthea Duncan
Arnold Abeshouse
Barry Duncan
Bernard & Shirley Maybloom
Brian Rathborne
Brooks Wilson AM
Bruce and Barbara Walker
Charlie Shuetrim AM & Sandy Shuetrim
David Routley
Donald Hector
Electra Wiggs
Elizabeth Cameron
Fraser Campbell
Garry Besson
Graham Easton
Gwen Chaikin
Harry McBurney
Ian Lewis
J. Barnes
J. Graeme Herriott
Jeffcott Edmunds
John Cameron
John & Margaret Gilfillan
John Watson
Joshua Berger

Joyce Lin
June Duncan
Kevin Meyer OAM
Livingstone Investments (NSW) Pty Ltd
Lili Middleton
Mary Glendinning
Mary Mulhearn
May Turner
Moreton Rolfe
Morrish Besley
Norman Brunsdon
Patricia Lee
Patrick Gallagher
Paula Flynn
Peter Francis
Philip Abbott
R. Mills
Richard Cook
Robert Albert
Ronald Webb
Russell Beers
Sam Miller
Stephan Center
Thomas Pinzone
Zelia Caldeira

Ambassadors

Anna & Alessandro Pavoni from Ormeggio at the Spit
Chris Russell
Commissioner Greg Mullins
AFSM
Con Dedes from the Dedes Group
Emily Tutt

Community organisations

Australian Rugby Union (ARU)
Community Heart Health Care Red & White Committee:
Fiona Taylor
Jenny Carr
Lori Farrar
Lynn Varvel
Lynne Ravenhall
Northern Suburbs Rugby Club

Corporate supporters

Accolade Wines
Artarmon Framing
Bayer Australia
Blackmores Ltd
Dedes Waterfront Group
Goodwill Getaways
Holman Webb Lawyers
NAB
Northern Sydney Local Health
Ormeggio Pty Ltd
Park Hyatt Sydney
Ramsay Health Care Ltd
Woolworths Group
Zouki Group of Companies

Gifts in wills

The Estate of the Late:
Barry John Willoughby
Beryl Elizabeth Raymer
Edwin Alfred Britt
Jannett Loxley
Joseph Thomas Brookes
Margery Kathleen Burroughs
Milan Beribak
Nathalie Kulakowski
Norma Dawn Spencer
Paul Thomas Horn
Sydney Thomas Wickham
Tatiana Madatow

76% of Australian females and 68% of males are physically inactive.

SOURCE: (AIHW) Women and heart disease: cardiovascular profile of women in Australia (full report, 1 Jun 2010).

Trusts and Foundations

Chatswood RSL Club
Emorgo Foundation
Ernst & Young Foundation
Skipper Jacobs Charitable Trust
The Lady Proud Foundation
The Lin Huddleston Charitable Foundation
The Mill House Foundation
Vonwiller Foundation



Heart
Research
Australia

Building 36
Royal North Shore Hospital
St Leonards NSW 2065

PO Box 543
St Leonards NSW 1590

P 02 9436 0056
E enquiries@heartresearch.com.au
W heartresearch.com.au

ABN 62 002 839 072