THE BAIRD INSTITUTE

Applied heart & lung surgical research

ANNUAL REPORT FINANCIAL YEAR 2023

CHAIR'S MESSAGE

Professor Paul Bannon
MB BS, FRACS, PhD

2022 marked a significant milestone for us as we celebrated our 21st birthday. Over two decades, The Baird Institute has evolved from a conventional surgical research group focusing on surgical outcomes to a hub of basic science research and, most importantly, translational research.

Translational research, often termed "bench to bedside," epitomizes our commitment to taking discoveries from the laboratory and applying them in the clinic, ultimately benefitting patients. This approach involves testing hypotheses in the lab, bringing new treatments to the bedside to assess their efficacy, and evaluating their impact on public health.

Throughout our journey, The Baird Institute has nurtured numerous PhDs, master's programs, and basic science initiatives. We've proudly contributed to major global publications and played a vital role in significant heart and lung clinical trials alongside the Royal Prince Alfred Hospital Cardiothoracic Department. This collaborative effort has directly influenced patients' lives by enhancing surgical procedures, follow-up protocols, and recognizing individual needs.

As we officially come of age at 21, The Baird Institute is pleased to formally acknowledge, partner with, and support the Centre for Heart Failure and Diseases of the Aorta. This maturation has been a gradual process, with the largest single-unit surgical database, the most sophisticated analysis of surgical outcomes and the only database linked with the largest cardiac muscle and aortic tissue biobank in the world (known as the Sydney Heart Bank). This robust infrastructure positions us strategically to address at the bench, the significant challenges faced by our patients.

We are thrilled to throw our support behind the Centre's focus on innovative heart valve design, heart failure, and the biomechanics of the human aorta. Dr. Robert Hume, our post-doctoral fellow, spearheads a team in exploring human and model system heart failure, unravelling key disease processes in heart failure and aortic disease. An exciting venture within this initiative is Dr. Hume's exploration of engineering new aortic tissue for the replacement and repair of diseased aortas. The team is currently engaged in the design and engineering phase of a biodegradable graft. The primary objective is to create a graft that not only serves as a temporary replacement for damaged blood vessels, like the aorta, but also stimulates the patient's body to naturally regenerate new aorta tissue. This innovative approach involves encouraging the body's healing process by replacing the synthetic graft with newly generated tissue. Although this project is extensive and will span multiple years, its success would position us at the forefront of advancements in vessel replacements and aorta research. The Bird family's generous support in funding a significant part of Dr. Hume's fellowship this past year is deeply appreciated.

Under the guidance of Assoc/Prof. Sean Lal, the Sydney Heart Bank operates entirely on a not-for-profit basis. We pride ourselves on fostering collaborations with more than 30 research laboratories both globally and within Australia. Our commitment extends to seamlessly integrating independent external research initiatives with our in-house projects, forming a comprehensive approach. Our diverse spectrum of projects at the Sydney Heart Bank spans across various critical areas. From delving into cardiac regeneration and understanding contractile mechanics to exploring cellular and molecular cardiology, cardiac proteomics, and in-depth research on vascular and aortic diseases, our initiatives are at the forefront of cardiovascular research.

Post Doctoral Fellow, Dr Cassandra Malecki and Prof Richmond Jeremy are delving into the intricacies of how changes in the DNA code impact the severity of aortic disease. In studying Marfan syndrome, they have discovered that tweaks in the DNA coding of inflammatory genes are linked to the severity of cardiovascular issues. This crucial insight is now guiding our expanded research into other genetic conditions affecting the aorta.

We've also unearthed interesting findings related to miRNA molecules. In human vascular smooth muscle cells, alterations in these molecules influence pathways crucial to the function of these cells. This discovery suggests a potential connection to the formation of aneurysms. Presently, we are conducting an extensive analysis of aortic aneurysm tissue samples. This involves investigating over 4500 proteins and examining genome-wide RNA expression. These comprehensive studies aim to unravel the mechanisms behind aneurysm formation, potentially identify markers indicating the progression of aortic disease, and pinpoint new targets for effective treatment.

Your support is driving these critical investigations, bringing us closer to understanding and addressing aortic diseases. Thank you for being an invaluable part of our journey toward groundbreaking medical discoveries.

As always, we extend our gratitude for your steadfast support of our mission - to foster research and apply science to improve outcomes for patients facing heart or lung surgery. None of our accomplishments would be possible without the generosity of our donors, enabling us to fund groundbreaking research and attract top minds in the field. We remain dedicated to advancing our work, striving to improve the lives of patients facing heart and lung disease. Thank you for being an integral part of our journey.

Professor Paul Bannon

PATRON'S MESSAGE

The Hon Michael Kirby AC CMG

How thrilled my dear friend, Doug Baird, would be to witness the enduring legacy of medical excellence, research breakthroughs, and the promotion of public health at the Institute proudly bearing his name.

Doug Baird, a distinguished Professor at the University of Sydney and a brilliant surgeon, played a pivotal role in pioneering early coronary artery graft surgery. His ground-breaking contributions have paved the way for remarkable developments in surgical and medical practices, saving countless lives and alleviating immeasurable suffering. The Baird Institute, under the guidance of Professor Paul Bannon, continues this legacy, educating future coronary experts and fostering international collaborations that enrich the field.

Reflecting on my enduring affection for The Baird Institute, I recall my friendship with Professor Douglas Baird during our time at the University of Sydney. As fellow members of the Sydney University Union Board in the 1960s, we forged a bond that extended beyond our academic pursuits. Doug's journey from a gifted surgeon to a boundary-pushing research pioneer left an indelible mark. One of his early patients for bypass surgery was my mother. She died many years later. But her heart was beating strongly right up to the end. Later, warned by her experience, I sought care from our present Chair, Professor Paul Bannon. He displays the same skill and imagination of my friend Doug Baird. I will always be grateful for his surgical skills.

The latest cause for celebration at The Baird Institute is the establishment of the Centre for Heart Failure and Diseases of the Aorta, a groundbreaking venture. This innovative collaboration between The Baird Institute, the University of Sydney, and Royal Prince Alfred Hospital signifies a convergence of intellectual brilliance and practical clinical expertise. The Centre's fundamental objective is to expedite discoveries that enhance patient outcomes, with a focus on advancing the understanding, diagnosis, and treatment of heart failure and aortic diseases.

Heartfelt congratulations are in order for Dr. Robert Hume, appointed to a post-doctoral fellowship in the Centre, where he will lead a team dedicated to utilizing human and model system heart failure for further advancements.

The Baird Institute refuses to rest on its laurels. It actively engages in new and bold research projects that were not dreamed of in Doug Baird's lifetime. Like a family, the Institute accommodates contributions from both young and seasoned specialists, fostering an environment of scientific surgical advancement for the benefit of future generations to come.

Finally, Happy 21st Birthday to the Institute. Let's reflect on the countless lives saved, the suffering alleviated, and the groundbreaking discoveries that have defined your journey since 2001. Here's to two decades of innovation, collaboration, and unwavering commitment to improving patient outcomes. May the next years be filled with even more breakthroughs, and success.

The Hon Michael Kirby AC CMG

CEO'S MESSAGE

Ms Catherine Rush

We are delighted to share with you the latest edition of our Annual Report, and we extend our heartfelt gratitude for your unwavering support of our mission. Over the past 12 months, our dedicated team has been tirelessly pushing the boundaries of knowledge about the human heart and lungs, and we are thrilled to provide you with a glimpse into our work.

This year holds special significance as we celebrate The Baird Institute's 21st birthday. Twenty-One years has seen The Baird Institute develop from a typical surgical research group focusing on surgical outcomes, to basic science research and finally to translational research.

Reflecting on the past fiscal year, we are pleased to offer a comprehensive overview of The Baird Institute's financial performance. Your continued commitment and trust have been crucial in sustaining our mission to advance heart and lung research for the betterment of patient lives.

In the past financial year, The Baird Institute experienced a remarkable 94% increase in total revenue, reaching $940,000. This includes a combination of research grants, philanthropic donations, bequests, partnerships with like-minded organizations, and investment income.

Our financial stewardship remains unwaveringly focused on efficiency and accountability. A substantial 57% of our expenditure in the 2023 financial year has been directly allocated to research initiatives, a percentage set to increase significantly in 2024 due to the growth in the value of our net assets. This investment encompasses cutting-edge projects, fellowships, ongoing clinical trials, and the development of translational research programs, positioning The Baird Institute at the forefront of scientific advancement.

Encouragingly, our operating surplus increased by an impressive 413% in the 2023 financial year compared to 2022, while our net assets, totalling $1,831,607 as of June 30, 2023, demonstrated a 33% increase compared to June 30, 2022 – $1,375,935.

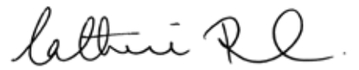
For a more detailed breakdown of our financial performance, please refer to the comprehensive financial statements on the last page of this report.

Looking ahead, we remain committed to maintaining financial sustainability. We will actively explore diverse funding streams, foster strategic partnerships, and uphold fiscal responsibility to ensure the long-term success and impact of The Baird Institute.

Our sincere thanks go to you for your continued trust and support, which is pivotal in fuelling our financial stability and the pursuit of groundbreaking discoveries. Your generosity has played a central role in our financial success, enabling us to fund pioneering research, support our brilliant researchers, and make significant strides in the field of heart and lung health.

In closing, we express our heartfelt gratitude for your ongoing financial support. Together, we are making significant strides towards a healthier future for individuals affected by heart and lung disease. Our work is possible because of you.

Thank you for being an indispensable part of The Baird Institute family.



Ms Catherine Rush

GOVERNANCE

The Baird Institute is registered as a charity with the Australian Charities and Not-for-profits Commission (ACNC). Eligible tax-deductible donations have Deductible Gift Recipient (DGR) status with the Australian Taxation Office.

WHO WE ARE

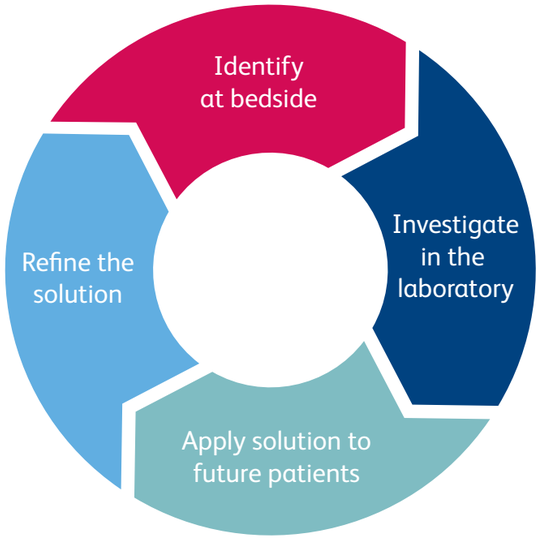
Established in 2001, The Baird Institute is the only dedicated cardiothoracic surgical training and research institute in Australia. A Sydney-based charitable organisation, the institute is operated by a small, multi-skilled team and supported by a board of pro-bono volunteers.

Our research model is a translational one. As an organisation, we focus on the translation of quality research into improved surgical practice and delivery of long-term public health solutions. This model incorporates expertise in surgical and clinical management with cutting edge research and surgical/health professional training to ensure we have a positive impact at all stages from diagnosis through to treatment and recovery of our patients.

PROFESSOR DOUGLAS BAIRD AM

20 JUNE 1940 – 16 NOVEMBER 1995

Professor Douglas Baird was a truly great Australian with a passion for improving heart and lung surgical techniques for the benefit of all. A young Baird developed his passion for cardiothoracic surgery whilst an intern at Royal Prince Alfred Hospital (RPAH) and later became a Fellow of the Royal Australasian College of Surgeons (RACS) in 1971. His commitment to excellence in medicine and surgery was obvious as a medical undergraduate when, at Sydney University, he also completed a Bachelor of Medical Science (BMSc) and won seven prizes including the University Medal. In his eulogy, Baird Institute patron, the Honourable Michael Kirby, described him thus: “Sweet was his nature and notable his achievements”.



OUR BOARD OF DIRECTORS

- Professor Paul Bannon, *MBBS PhD FRACS,* **Chair**
- Professor Jeffrey Braithwaite, *BA, MIR (Hons), MBA, DipLR, PhD, FIML, FCHSM, FFPHRCP (UK),* **Non-Executive Director**
- Mr Shaun Clyne, *MA LLM (Syd),* **Non-Executive Director**
- Professor Richmond Jeremy, *MB BS PhD, FRACP, FAHA, FESC, FCSANZ, GAICD,* **Non-Executive Director**
- Ms Joanne Wade, *BEc, LLB,* **Non-Executive Director**
- Associate Professor Sean Lal BMedSci (Hons), *MBBS(Hons), MPhil(Med), PhD(Med), FRACP,* **Non-Executive Director**
- Mr Ross Saunders, **Non-Executive Director**
- Ms Jivani Murugan, *BSocSc,* **Non-Executive Director**
- Associate Professor Christopher Cao, *BSc (Med), MBBS (1st Hon), PhD, FRACS,* **Non-Executive Director**

OUR STAFF

- Professor Martin Misfeld - **Co-Director of Research, Cardiothoracic Department, RPAH**
- Ms Catherine Rush - **CEO**
- Ms Lisa Turner - **Clinical Trials Manager.**
- Ms Lorna Beattie – **Clinical Trials Manager**
- Ms Sue Moore – **Administration and Events Manager**
- Ms Julia Favotto – **Donor Relations Assistant**
- Ms Tatum Faber – **Donor Relations Assistant**
- Ms India Perianayagam – **Administration Assistant**
- Mr Dhairya Vayada – **Data Research Assistant**
- Dr. Cassandra Malecki – **Postdoctoral Researcher and Biobank Manager**
- Dr. Robert Hume - **Postdoctoral Researcher**
- Ms Erin McMullen, **Company Secretary.**

OUR VISION

Our vision is to improve the outcomes and enhance the lives of those undergoing heart and lung surgery.

OUR MISSION

The Baird Institute’s mission is to foster research and apply science to improve the outcomes for patients facing heart or lung surgery. The money we raise funds research that directly improves the surgical techniques associated with heart and lung surgery. Improvements can include less intrusive procedures as well as techniques that improve survival rates.

Through our commitment to ongoing research and the application of scientific breakthroughs in technology, we can directly impact the quality of life for patients, post-surgery and save lives that may otherwise have been lost.

Founded on the principal that academic surgeons produce better outcomes, The Baird Institute prides itself on continued investment in research and training; enabling it to remain at the forefront of innovation, surgical robotics and revolutionary industry technology.

OUR AIMS

- **To Improve Patient Outcomes**
- **To Innovate**
- **To Conduct Research**
- **To Make Advances in Surgical Technology**
- **To Provide Ongoing Training and Development**

THE BAIRD INSTITUTE'S 21ST BIRTHDAY

On November 17, 2022, we happily marked our 21st anniversary at Rydges Hotel in Camperdown, surrounded by our dedicated team and numerous supporters. It was a memorable evening commemorating 21 years of groundbreaking cardiothoracic surgical research.

While we traditionally gather annually with our supporters to provide updates, the challenges of the past three years, driven by the global pandemic, had made such gatherings impossible. Our last event took place in December 2019, just as the initial cases of Covid-19 were emerging overseas.

The Hon Michael Kirby AC CMG, our esteemed Patron, kicked off the proceedings by extending a warm welcome to the Institute's supporters present, expressing heartfelt appreciation for their unwavering support over the past two decades. Following his welcoming remarks, Professor Paul Bannon, our Chair, elaborated on The Baird Institute's pivotal role in cardiothoracic surgical research and training since its inception. Notably, he highlighted the Institute's evolution from a typical surgical research group in 2001, focusing solely on surgical outcomes, to its current commitment to translational research.

During the event, Board member Associate Professor Sean Lal shed light on the newly established Centre for Heart Failure & Diseases of The Aorta. He outlined the Centre's focus on three major areas: innovative heart valve design, heart failure, and the biomechanics of the human aorta. Professor Bannon introduced Dr. Robert Hume, our post-doctoral fellow, who will lead a team dedicated to utilizing human and model system heart failure to understand key disease processes in heart failure and aortic disease.

A poignant moment occurred during the Q&A session, where Professor Bannon engaged in a discussion with two patients, twin brothers Paul and Simon Molino, both of whom underwent open heart surgery in 2022, just a few weeks apart at the age of 39. Their generous sharing of pre- and post-surgery experiences underscored the profound impact that our research could have on their families.

The evening also featured a brief address by Will Bird, a generous supporter of The Baird Institute, who spoke on behalf of his family about their decision to support The Baird Institute's Aortic Research program. The Bird family's significant contribution is greatly assisting in funding Dr. Hume's fellowship over the next three years. Will shared that his father, Rob Bird, tragically succumbed to Aortic Dissection in 2010, inspiring the family's commitment to funding aortic disease research at The Baird Institute. In recognition of their steadfast support over the years, Professor Bannon presented the Bird family with a plaque.

The event concluded with the enjoyment of excellent canapés and refreshments. To cap off the celebration, everyone joined in singing Happy Birthday to The Baird Institute and participated in cutting a substantial cake in commemoration of its 21-year journey. Special thanks were extended to Rydges Hotel, Camperdown, and Mr. Jack Tolani for their generous support in funding a significant portion of the birthday festivities.

NEW APPOINTEES

Dr. Robert Hume PhD, Senior Postdoctoral Fellow The Rob Bird Aortic Research Program, Centre for Heart Failure and Diseases of the Aorta.

Growing up in England, I completed my undergraduate and master's degree in Biomaterial Science and Tissue Engineering at the University of Sheffield, UK. After a short period as a research assistant in Sheffield, I then undertook a PhD in pathology at the University of Cambridge, UK. At this point, I decided it was best I left rainy England and set sights for brighter (and sunnier) pastures. I was then fortunate enough to secure a position as a Postdoctoral Research Associate in Associate Professor Dr James Chong's Cardiac Regeneration Laboratory at the Westmead Institute for Medical Research, Sydney. During this time, I investigated novel therapeutics to treat heart failure and their underlying mechanisms.

I have recently started a Postdoctoral Fellowship at The Baird Institute within the newly established Centre for Heart Failure and Diseases of the Aorta, headed by Professor Paul Bannon, Dr Sean Lal, and Associate Professor Dr John O'Sullivan. This incredible opportunity will allow me to undertake ground-breaking research into heart failure, cardiac regeneration and diseases of the aorta. My research will focus on tapping into the heart's ability to regenerate what is supressed in adulthood and using this mechanism to treat the failing heart. I will also be focusing on tissue engineering new aortic tissue with the intention of replacing and repairing diseased aortas. Through high-end laboratory experiments, access to precious human samples and the support of the team around me, high impact publications are on the horizon, which will help shape the future of cardiac and aorta research.

Robert's 3-year fellowship has been generously funded by the Bird Family. Rob Bird died of an Aortic Dissection in 2010 and his family have made a commitment to funding aortic disease research at The Baird Institute. As a result, we have named the aortic research program after Rob Bird.

Shaneel's Story

RHEUMATIC HEART DISEASE

I would like to thank The Baird Institute for giving me this opportunity to tell my story, it's an honour.

I was diagnosed with Rheumatic Heart Disease at the age of 13. It was all very odd how it happened. I remember having a stomach-ache that just wouldn't go away and somehow during all the check-ups and tests, my GP picked up something in my heartbeat which eventually lead to the diagnosis.

The rest of my teenage and young adulthood years was uneventful. I would have my regular yearly check-up with my cardiologist, but otherwise my life was normal; lots of sports, plenty of laughs and good food. My cardiologist did always remind me that my leaky aortic valve would need to be replaced one day. I also knew it was coming but I guess I always thought of it as an "I'll deal with it when it happens" type of situation.

That day did come eventually in 2011. I still hadn't felt any symptoms from this condition that I had carried for at least 16 years, but I guess my valve had passed that safe threshold in the eyes of my cardiologist and it was time to operate. The operation itself went smoothly, I know having open heart surgery wasn't exactly straightforward but from what I could tell, everything went to plan. I now had a new tissue valve which would take me through the next 5-15 years of my life.

Post-surgery I eventually went back to my once-a-year check-up schedule. I got married, had 2 beautiful kids and just carried on like most other people.

Now, fast forward to October 2021 and things started to change.

I knew I was getting older, but this felt a bit different... struggling for breath was not something I was used to, but I ignored it for the first month. As the weeks and months passed by things slowly but surely got worse. Basic everyday tasks just seemed so difficult, and my quality of life was dropping fast. In January 2022, my cardiologist confirmed what I already suspected. The tissue valve that I had received in 2011 was now deteriorating quickly and we had to get it replaced again.

Pre-surgery tests were booked in but I never made it to those appointments. I checked myself into Burwood Emergency department late February 2022 after struggling through a tough 24 hours at home. In hospital I was told that my lungs were full of fluid due to my weak heart valve, and they would basically stabilise me until they could find an operation timeslot at RPA where the surgery had to be done... hopefully within the week. That week was a

"I didn't know then but apparently this procedure had never been attempted with an existing replacement valve before which is just amazing if I think about it now."

struggle, the doctors and nurses were fantastic, but I think my heart valve was giving up fast. A week later, I was transported to RPA via an ambulance with lights and sirens. I was told that this trip would take 20 minutes, but it felt like 20 hours! This was the worst I had felt throughout my entire experience thus far. I felt like I was drowning, each breath felt like it was going to be my last.

Once I got to RPA, the ICU team could see that I really wasn't looking too good. That's where I first met Dr Plunkett who was the cardiothoracic surgeon on duty. After stabilising me and quickly going through the documentation of the many many tests I had already done over the last week, I was told of the grim reality of my situation by Dr Plunkett. My heart is operating at 20% capacity and the situation isn't great. The next set of words that he said, I will never forget... "I will do my best to get you out of this situation mate, don't you worry".

I wouldn't be able to have the original open-heart surgery as planned as that would more than likely kill me, so Dr Plunkett worked with his colleagues to devise a new plan. They would insert a new tissue value (via keyhole surgery) and basically push out the old tissue valve.

I woke up with the usual tubes and needles which I had experienced all before in 2011 but unbeknown to me, I had actually been in an induced coma for 5 days. As I slowly got to piece together the events after I had been put to sleep, I came to know exactly how lucky I was to be alive. To start off, my body had initially rejected the life support machine, so I went into cardiac arrest. I had to google this term 'cardiac arrest' when I was told it, but I don't think I will ever forget it!

Second term that I had to google was 'ECMO'. Extracorporeal Membrane Oxygenation, a mouthful, but this amazing machine kept me alive and gave my heart and lungs a break. A break that was needed before any surgery could be performed. The rest of the recovery was straightforward, especially in comparison to the events that led up to it. I'm alive and now well, feeling great but also grateful. Things could have been so different, but a combination of great people and world class medical technology is why I'm here today telling my story.

The important research and development done at The Baird Institute will ensure there will be many stories like mine in the days, weeks, and years to come.

RESEARCH UPDATE

CENTRE FOR HEART FAILURE AND DISEASES OF THE AORTA

The Baird Institute has partnered with the University of Sydney and Royal Prince Alfred Hospital to establish an exciting new **Centre for Heart Failure and Diseases of the Aorta**. This new venture aims to make advances in the discovery, diagnosis, and treatment of **heart failure** and **aortic diseases**. The Centre's overarching aim is to accelerate novel discovery to improve outcomes for patients with heart failure and aortic disease. Led by Professor Paul Bannon, Professor John O'Sullivan, and Dr Sean Lal, the centre will apply its unique resources and expertise to address major unmet needs in these fields. The new Centre has a world-leading bench-to-bedside program that has several unique resources on a global scale: *Heart Failure Biopsy Programs* not available anywhere else; the *World's Largest Heart Biobank*; one of the world's only *Aorta Biobanks*; and pre-clinical models of Heart Failure and Aortic Disease.

The Centre has a strong governance structure carefully facilitating the linkage between basic science, clinical translation, consumer outreach, and commercialisation. The Centre has established and leads two active clinical trials in heart failure. It will be in a position to capitalise on opportunities in the emerging biomedical precinct incorporating the Sydney Biomedical Accelerator and Tech Central. These strengths coalesce at a critical juncture and will drive important advances in Heart Failure and Aortic disease and improve patient outcomes."

CLINICAL TRIALS UPDATE

Lorna Beattie, Lisa Turner and Carmel Oostveen, the Clinical Trial coordinators, manage all Cardiovascular Clinical Trials within Royal Prince Alfred Hospital (RPAH) assisted by Dhairya Vayada who is a research assistant employed by the Baird Institute who supports the department with research and data management.

There continues to be challenges following the pandemic, but we are happy to say that the recruitment for clinical trials and biobanks at RPAH are on the rise.

RPAH ran the TRiCS III trial back in 2015-2016 which assessed transfusion strategies in patients having heart surgery. This trial showed that a restrictive blood transfusion strategy is as effective as a liberal strategy. However, it was also noted that restrictive transfusion practices may put younger patients at risk of harm and TRiCS IV will now be assessing blood transfusion strategies in a younger patient population. The research team hope to commence TRiCS IV at RPAH in December.

The team are also working on an application to CHeReL (Centre for Health Record Linkage) for a mass data linkage project looking at long-term outcomes in cardiac surgery for 12,000 patients which will have a significant impact in the cardiovascular space. There are several students, registrars and Cardiothoracic trainees involved in the process of collating and analysing data.

THE CARDIAC PRECISION GROUP AND THE AORTIC RESEARCH GROUP

Dr Cassandra Malecki BMedSc (Hons), PhD Senior Postdoctoral Fellow

Since starting in this post-doctoral position, I have assisted with the progression of multiple projects within the cardiac precision group and the aortic group, overseen the collection of tissue and management of the Sydney Heart Bank and initiated my own research project and research questions.

Coming from a background in molecular biology, I was first able to assist in helping students in executing techniques in the lab to examine the level of expression of relevant genes in heart failure samples and how these levels compare to those in healthy hearts. I have also been involved in helping prepare samples for large-scale analysis of human aortic and cardiac samples, which have allowed for the investigation of over 4500 proteins and genome-wide RNA expression in different types of heart failure and aortic disease, contributing to the findings of multiple projects, with some currently being written up for publication.

I was given the chance to take the lead on an exciting project investigating the changes that occur in the heart as we age. Age is one of the biggest risk factors of heart failure, and therefore understanding the changes that occur in the heart as we age will assist in the development of preventative and therapeutic options for heart failure. We are currently looking at levels of proteins, metabolites, and lipids and the expression of thousands of genes in hearts of individuals over the age of 50 and comparing these to hearts of individuals 20 and younger. This is the first ever study to characterise the molecular changes that occur in normal ageing of the human heart. We have found very interesting and novel results including changes in levels of contractile proteins and seen how the heart changes its ability to utilise energy as we age. We are currently writing up the results of this study, with the aim to submit it for publication this year, to a highly prestigious scientific journal.

Most of this research is made possible due to the utilisation of the unique resource that is the Sydney Heart Bank. A major part of my role has involved collecting precious human heart and aortic tissue samples from RPAH, processing the tissue, managing the Sydney Heart Bank database, and preparing samples for other members of the lab and collaborators around the world who are using the tissue for their own research projects. I have also optimised protocols for tissue collection and processing and have put systems in place to keep thorough track of samples coming in and out of the heart bank and tracking sample information.

To expand on the cardiac ageing project mentioned earlier, I have taken a particular interest in developing a project that examines how the aorta changes at a molecular level with age, and how these changes may impact the heart. The aorta naturally becomes stiff as we age. The stiffer the aorta is, the harder the heart must work to pump blood into the aorta and around the body. If the heart is under these higher stresses for an extended period, this can lead to heart disease. Therefore, understanding the relationship between the aorta and heart in ageing may bring to light new therapeutic options for heart disease. After thoroughly examining the Sydney Heart bank database, I identified healthy heart tissue and healthy aorta that were from the same individual, with samples covering a wide age range. I have used these samples to examine the molecular relationship between the aorta and the heart as we age. Currently, genome-wide RNA expression and protein levels of the tissue samples have been completed, with the data to be analysed in the next few months and future experiments in the planning process.

RESEARCH UPDATE

THE SYDNEY HEART BANK (SHB)

Centre for Heart Failure and Diseases of the Aorta
A/Prof Sean Lal BMedSci(Hons), MBBS(Hons), MPhil(Med), PhD(Med)

In 1989, in collaboration with the late Dr. Victor Chang AO, Prof. Cris dos Remedios established the Sydney Heart Bank (SHB) at the University of Sydney to collect and store explanted human hearts for research purposes. The SHB now comprises over 18,000 human cardiac samples from explanted failing hearts and non-diseased donor hearts from patients at St Vincent's Hospital Sydney. In more recent years, under the Directorship of A/Prof Sean Lal, the SHB is now a biobank of international standards that has also expanded to prospectively procure heart, aortic, and vascular samples from patients at Royal Prince Alfred Hospital in collaboration with Prof Paul Bannon and Dr Jacky Loa.

The SHB is completely not-for-profit and collaborates with over 30 research laboratories within Australia and around the world. The independent external research projects are in conjunction with our own in-house projects. The research projects range from examining cardiac regeneration, contractile mechanics cellular and molecular cardiology, cardiac proteomics, vascular diseases, and aortic diseases.

We gratefully thank the support of The Baird Institute and the Faculty of Medicine and Health at the University of Sydney in maintaining the infrastructure, staffing, and operations of the SHB. We also acknowledge the patients and staff of St. Vincent's Hospital Sydney and Royal Prince Alfred Hospital.

SHB Executive
A/Prof Sean Lal
Prof Paul Bannon

Biobank Manager
Dr Cassandra Malecki

Biobank RA
Ms Sheena Mali

RPA biobank team
Prof Paul Bannon
(Cardiothoracic Surgeon)
Dr Jacky Loa
(Vascular Surgeon)
A/Prof Sean Lal
(Cardiologist)
Senior clinical nurses;
Lisa Turner & Lorna Beattie,

BUILDING A PLATFORM FOR SURGICAL PERFORMANCE AND AUDIT

Mr. Dhairya Vayada, BBiomedSc, Data Research Assistant, The Baird Institute

With a substantial amount of information collected before, during and after a surgery, there is a large amount of data generated. This data can be used to uncover rich insights into the surgical process, helping the surgeons to identify trends, performance, and ways to improve patient outcomes and experience.

One of the challenges is to present the data in a way that enables the surgeons to interpret insights and draw meaningful information from it. I am currently working on a secure clinical data analytics platform to present anonymized data in a graphical and interactive format. Key components of this platform include; surgical dashboards which enable each surgeon to analyse their key metrics and performance as well as observe the unit's performance as a whole; a resource utilization dashboard to observe how the unit uses resources during surgery; and finally the plotting of surgical patients' locations on an interactive map.

The platform has enabled the automation of some parts of the auditing process, allowing graphs and tables for the quarterly surgical audit to be generated instantly. The platform is also modular and future-oriented so technologies such as artificial intelligence and machine learning can be rapidly implemented, helping the cardiothoracic surgeons identify areas for potential research and scope for patient outcome improvement.

OUR TEAM

THE BAIRD INSTITUTE CHAIR, CEO, BOARD MEMBER, RESEARCHERS AND ADMIN STAFF

Front Row - From Left to Right

Julia Favotto – Donor Relations Assistant
Sue Moore - Admin & Events Manager
India Perianayagam – Admin Assistant
Lisa Turner – Research CNC
Catherine Rush – CEO
Lorna Beattie – Clinical Trials CNC
Cassandra Malecki - Post Doctoral Researcher

Back Row - From Left to Right

Tatum Faber – Donor Relations Assistant
Paul Bannon – Chair
Ross Saunders – Board member
Robert Hume – Post Doctoral Researcher

OUR SUPPORTERS

Since its inception, The Baird Institute has been privately funded by bequests left by former patients of the surgeons who are associated with the Institute, corporate funding from our partners and donations received from our supportive group of donors who provide both donations to continue our research and their time in organising fundraising events for The Baird Institute. We greatly appreciate their unwavering support.

PARTNERS IN RESEARCH

We are very lucky to have a group of committed supporters who provide donations to The Baird Institute on a regular and continuing basis. Our ***Partners in Research*** support us because we deliver long term life-changing solutions that can save lives and make such a difference to people living with chronic disease. The steady stream of funding provides some certainty for The Institute in a competitive and unpredictable funding environment and allows us to plan for the future with confidence.

CORPORATE SUPPORTERS

Special thanks goes to our corporate partners, Baxter and Edwards, who provide assistance in the form of educational grants for research scholarships.

Edwards

Baxter

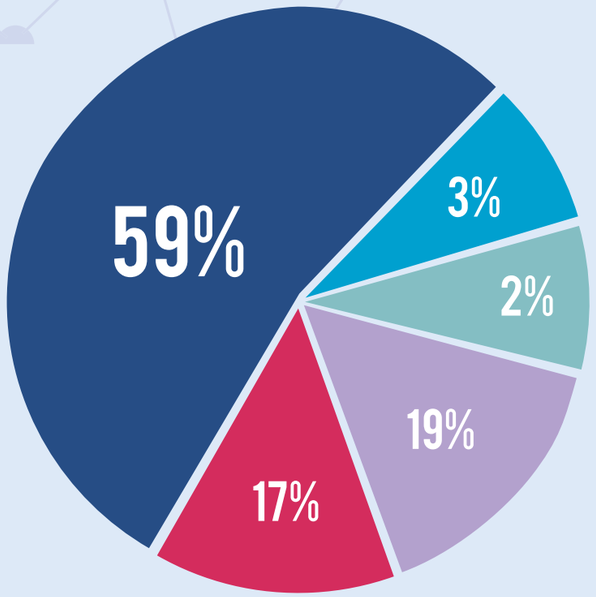
PHILANTHROPIC SUPPORTERS

Lin Huddlestone Charitable Foundation
Pro Choice Safety Gear – The Bird family

PRO SAFETY GEAR prosafetygear.com

The Lin Huddleston Charitable Foundation

FINANCIAL HIGHLIGHTS 2022/2023



ORIGIN OF DONATIONS
2022-2023

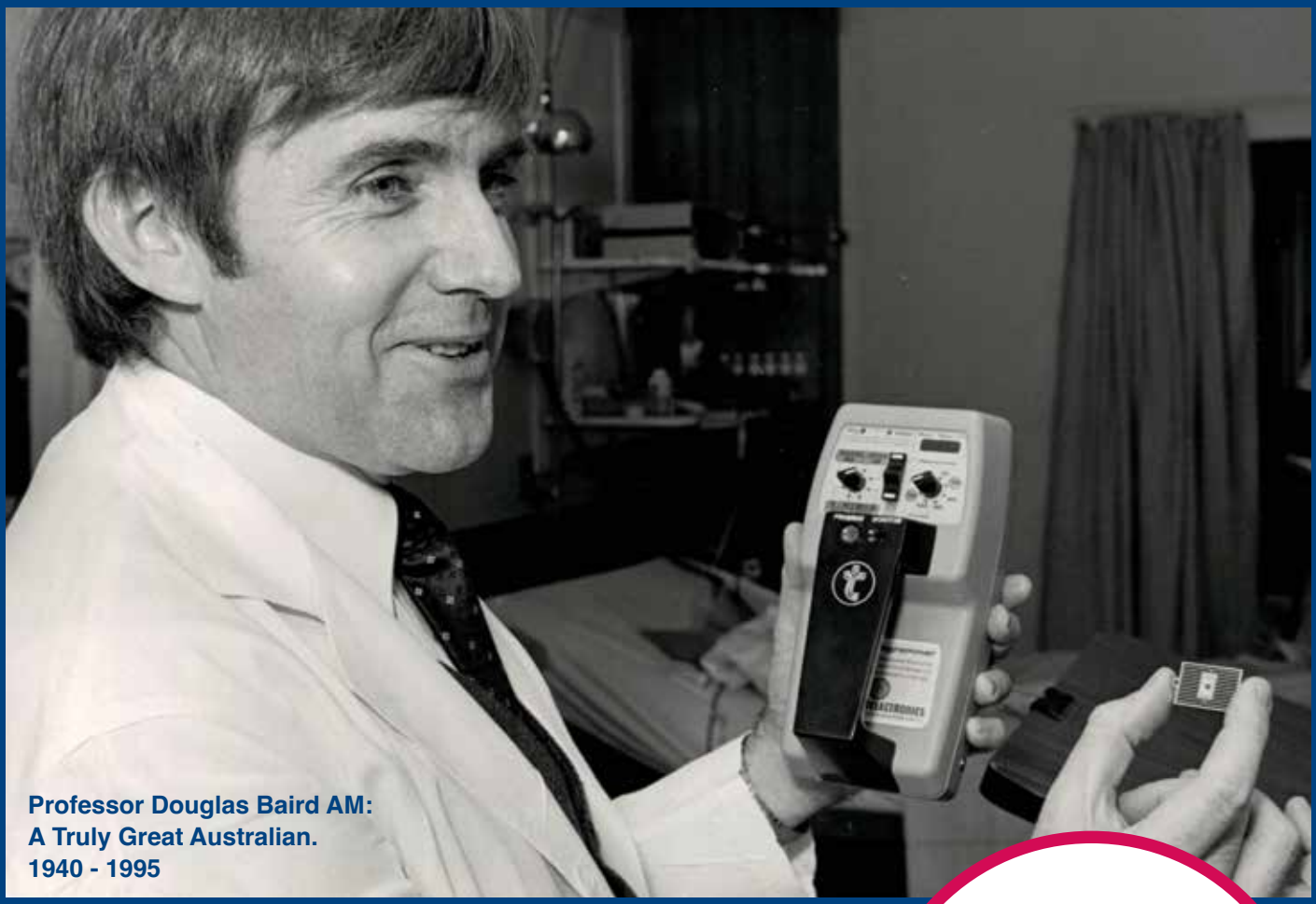
- Community fundraising
- Bequests & memorials
- Industry partners
- Philanthropy
- Appeals, recurring & general donations

FINANCIAL SUMMARY

DETAILED INCOME STATEMENT	FY 2023	FY 2022
Revenue		
Donations and fundraising	$ 438,852	$ 305,461
Bequests	$ 145,444	$ 1,033
Research and training	$ 292,843	$ 239,112
Interest and investment income	$ 63,441	$ - 63,468
Miscellaneous income	$ 0	$ 653
TOTAL	**$ 940,580**	**$ 482,791**
Expenses		
Employee benefits - admin	$ 124,686	$ 119,203
Employee benefits – research	$ 151,724	$ 132,296
Research project expenses	$ 124,054	$ 57,722
Office expenses	$ 21,151	$ 22,364
Marketing and fundraising	$ 56,832	$ 55,440
Investment expenses	$ 6,459	$ 6,968
TOTAL	**$ 484,906**	**$ 393,993**
Surplus/Deficit for the period	**$445,674**	**$ 88,798**

STATEMENT OF FINANCIAL POSITION	30/06/2023	30/6/2022
Assets		
Cash and cash equivalents	$ 994,196	$ 592,578
Investments	$ 907,808	$ 852,733
Trade and other receivables	$ 49,644	$ 20,706
Other current assets	$ 2,896	$ 6,932
TOTAL	**$1,954,544**	**$1,472,949**
Liabilities		
Trade and other payables	$ 65,651	$ 29,725
Employee entitlements	$ 57,286	$ 33,956
Other liabilities	$ 0	$ 33,333
TOTAL	**$122,937**	**$ 97,015**
NET ASSETS	**$1,831,608**	**$1,375,934**

The figures above have been taken from the reviewed financial statements of The Baird Institute for the relevant periods.



Professor Douglas Baird AM:
A Truly Great Australian.
1940 - 1995

For a full list of all research publications of

The Baird Institute, please go to our website

https://bairdinstitute.org.au/research/our-publications/

WE NEED YOUR HELP

Please visit the following webpage to see how you can help our cause.

https://bairdinstitute.org.au/you-can-help/

THE BAIRD INSTITUTE
Applied heart & lung surgical research

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