RAINE

MEDICAL RESEARCH FOUNDATION

SINCE 1957

ANNUAL REPORT 2023

Contents

Our partners and donors

We have had another year of strong support from our ongoing partners and donors. Our thanks for their continued support toward our aligned objectives to support the highest calibre emerging medical researchers in Western Australia to achieve translatable health outcomes for the community.

Government of Western Australia Department of Health

Western Australian Future Health Research & Innovation Fund

BrightSpark Foundation Western Australia Supporting Research into Child Health

Charter Hall

The University of Western Australia

COCKELL BEQUEST

HEALY Medical Research Foundation

THAN THAN HTAY

Strachan Bequest

KY Wong Family

RICHARD VAUGHN

About the Foundation

The Raine Medical Research Foundation traces its origins back to 1957, when Mary Raine, an astute businesswoman, decided to leave her considerable wealth, including a substantial portfolio of properties and hotels in Western Australia, for the explicit purpose of funding medical research. In August of that year, Mary Raine signed the Deed of Trust, bequeathing her property empire to The University of Western Australia, with a clear directive outlined within the document.

Mary Raine's vision, as expressed in the Deed of Trust, was unambiguous: "The net income of the Fund shall be applied towards seeking, diagnosing and investigating the nature, origin and causes of diseases in human beings, with the initial emphasis on arteriosclerosis and allied diseases, and the prevention, cure, alleviation and combating of such diseases". This vision has resonated over almost 7 decades, shaping the Foundation's mission and impact.

The Foundation takes pride in its commitment to supporting Early Career Researchers in Western Australia, nurturing them to become leaders in their respective fields. To ensure the highest standards, we have a robust grant review processes, maintaining transparency and equity. Our efforts have been recognized and applauded by our partners, who recognize the significance of this support in bolstering the region's medical research capabilities. We facilitate emerging researchers to become leaders in their field as well as collaborative initiatives that enable Western Australian researchers to engage with and learn from globally recognised leaders in their fields.

Through today, the Raine Foundation has allocated more than $60 million towards medical research, a testament to Mary Raine's enduring legacy and her foresight in providing vital funding for medical advancements. This investment has yielded extraordinary returns, leading to improved health outcomes for the community. Many of our Early Career Researchers, nurtured by the Foundation, have risen to become world-class medical research leaders, embodying the spirit of Mary Raine's generosity and vision.

The Raine Foundation supports an array of programs which include:

- **Raine Priming Grants:** Our flagship program, tailored for Early Career Researchers who are on the path toward establishing themselves independently in the field. They provide crucial support for pursuing medical research projects and programs aimed at advancing both health outcomes and the researchers' careers.
- **Clinician Research Fellowships:** These fellowships are designed to inspire clinicians, allied health professionals and nurses employed in Western Australian hospitals to enhance their research skills and capabilities. By nurturing their research potential, we aim to empower them to contribute significantly to the improvement of healthcare outcomes within our community.
- **Research Collaboration Awards:** Through this program, we foster skills transfer, facilitate global networking opportunities through travel support, and enable participation in conferences both domestically and internationally. This aims to enhance research collaboration on a global scale, fostering innovation and driving advancements in various fields.
- **Publication Prizes:** These prizes acknowledge the achievements of Early Career Researchers in WA who have the best published scientific papers, providing them a travel allowance to facilitate conference attendance, networking, and research collaboration

We also support other ventures and programs that align with our strategic goals, with established partner organisations, including:

- **The Raine Study:** Renowned as a world-leading longitudinal cohort study, it serves as a vital platform for researchers worldwide to explore health and medical inquiries across the entire lifespan. Initiated in 1989, the Raine Foundation stands as its proud pioneer in supporting its endeavors.

Chair's Report

As we look back on another successful year at the Raine Medical Research Foundation, I am inspired by the relentless dedication and groundbreaking achievements of our research community. This annual report is a testament to the power of innovation and collaboration in overcoming the most pressing health challenges of our time, highlighting the paramount importance of medical research in tackling global health challenges.

In reflecting on the significant events of 2023, we welcome Dr Amelia Scaffidi as Acting Director of the Raine Foundation. I extend my heartfelt thanks to Dr Amanda Cleaver, who has done a sterling job in her role as Director of the Foundation over these past seven years. Her leadership has overseen a transformation and modernisation of the administrative backbone of the Foundation's programs and played a pivotal role in the Foundation's strategic review. Dr Cleaver's outstanding leadership facilitated a smooth transition to Dr Scaffidi's stewardship, ensuring the ongoing efficiency of the Raine Foundation and paving the way for its ambitious expansion goals.

The Raine Medical Research Foundation remains steadfast in its commitment to fostering world-class research that contributes significantly to societal well-being. In alignment with our mission, we continue to collaborate with like-minded organizations dedicated to promoting medical research excellence. Support for Early Career Researchers remains a cornerstone of our efforts, with many notable scientists, including Professor Fiona Wood, as well as the current and previous Chief Scientists of Western Australia, Professor Peter Klinken and Professor Lyn Beazley having benefited from our Foundation during their formative years. As we navigate the evolving landscape of medical research, we remain focused on areas of critical need within Western Australia, aiming to cultivate a robust pool of local research talent poised to lead future advancements. Our strategy emphasizes collaboration with partners and donors to achieve these goals.

We extend our deepest gratitude to our partners and donors whose unwavering support throughout 2023 has been instrumental in our achievements. Key partners and supporters in this and recent years include the Healy Foundation, the WA Department of Health, the Charter Hall Group, the BrightSpark Foundation and the Stan Perron Charitable Foundation, among others. Their continued generosity has been pivotal to our success.

I express our sincere appreciation to the members of the Raine and Healy Research Committees, the Finance & Strategic Advisory Committee, and our various advisory committees for their unwavering commitment to our mission. I would also like to acknowledge Professor Jeff Hamdorf and Professor David Joyce who have departed from the Raine and Healy Research Committee after many years of service. We express our gratitude to the both of them for their years of dedication to our cause.

As we embark on 2024, our priorities include enhancing the Raine Foundation's brand and public profile, and seeking greater community support to ensure the continuation of our critical funding. We are dedicated to expanding the Foundation and collaborating with others to make a tangible impact on the health and well-being of the Western Australian community. We look forward to another year of impactful research and continued progress, driven by the collective efforts of our partners, donors, and the research community.

Professor Amit Chakma
Raine Research Committee Chair

> **"The Raine Medical Research Foundation remains steadfast in its commitment to fostering world-class research that contributes significantly to societal well-being."**

Director's Report

Since its establishment in 1957, the Raine Medical Research Foundation has distributed over $60 million to over 600 medical researchers across Western Australia's academic and medical institutes.

As national funding opportunities intensify in competitiveness, the Foundation's role grows ever more critical in addressing local research needs which aim to improve the lives of individuals impacted by illness. Despite possessing a robust investment strategy, demand always outstrips the funds available for research, resulting in many deserving research proposals going unfunded. This challenge was central to the Foundation's strategic review and the ongoing efforts of the Foundation to secure even more funding for research.

At the heart of the Foundation's strategic review lies our commitment to expand support for medical research and this year marks a pivotal milestone as we embark on this commitment. At our 2023 Annual Awards ceremony, we unveiled our revitalized brand, featuring a renewed visual identity. This represents a crucial milestone for the Foundation as we move towards attaining charitable status. Coupled with our rebranding efforts, these steps are pivotal in realising our full fundraising potential, which will enable the Foundation to expand our support for innovative and groundbreaking research aimed at improving community health outcomes.

In 2023, our commitment to fostering future leaders in medical research, pioneering new treatments, and advancing knowledge in Western Australia remained unrelenting. Our flagship Raine Priming Grants, Clinician Research Fellowships, Research Collaboration Awards and Publication Prizes continue to demonstrate our dedication to cultivating talent and fostering connections at the local, regional, national and international scales through collaborative research efforts.

We proudly extended our support to the forefront of medical inquiry by awarding more than $3.06 million to 19 recipients in 2023. This funding injection into research, span a wide array of critical areas, from infectious disease to cardiovascular disease to cancer and mental health and perinatal health, among others.

Raine Priming Grants: Early Career Researcher grants of up to $250,000 each were awarded to seven recipients, with a total funding allocation of $$1,483,507.

Clinician Research Fellowships: Four fellowships were awarded to clinicians and allied health professionals to commence in 2024, with a total funding allocation of $1,364,977.

Research Collaboration Awards: Five Awards were granted of up to $30,000 each to facilitate cross-institutional global collaboration, with a total funding allocation of $134,297.

Publication Prizes: Three $5,000 Prizes were awarded to Early Career Researchers to facilitate collaborative activities and conference attendance, with a total funding allocation of $15,000.

The continued success of our grant programs hinges on the support of our generous donors and partners. Together, we have made significant strides in understanding and improving human health, demonstrating that through collective effort, we can make profound impacts on the lives of countless individuals.

Special recognition is also due to our dedicated committee members and external reviewers, whose voluntary efforts in reviewing grant applications are invaluable. I would also like to extend my appreciation to Dr Amanda Cleaver for her outstanding leadership, which has been instrumental in the Foundation's accomplishments. We wish her continued success in all her future endeavors.

Looking ahead, our focus remains on cultivating robust relationships with partners, and prospective donors to expand our funding base. In 2024, we will continue to advance our strategic review activities to pave the way for growth and greater impact. Our goals include highlighting our remarkable research successes, launching a new website, and expanding support for our programs. Let us celebrate our achievements for 2023 and look forward with hope and determination to the remarkable possibilities that lie ahead.

Dr Amelia Scaffidi
A/Director

RAINE PRIMING GRANTS

Building the next generation of research leaders

This program supports Early Career Researchers to develop research independence and leadership, while building their skills and track record so that they are competitive for national and international funding programs.

GRANTS AWARDED IN 2023

40
Applications

13
Shortlisted

7
Successful
(17.5% success rate)

$1,483,507.30
Amount Awarded

Dr Andrew Stevenson

The University of Western Australia

Developing next generation cell therapies for enhancing skin regeneration after injury

$241,479.00

Dr Renee Carey

The University of Western Australia

Diesel and dust: Do current mining exposures impact the long-term health of workers?

$242,598.17

Dr Cele Richardson

The University of Western Australia

Goodnight, Poor Sleep: Evaluating a Low-Barrier Solution for Youth Sleep and Mental Health

$233,731.50
Co-funded by the Raine Foundation, the Cockell Bequest and the BrightSpark Foundation

Dr David Preece
(Raine/Robson Fellow)

Curtin University

Addressing the Loneliness Epidemic in Young People: Bridging Affective and Clinical Science

$237,164.63
Co-funded by the Raine Foundation, Charter Hall, the Cockell Bequest and the BrightSpark Foundation

A/Prof Rajesh Thomas

Center for Respiratory Health, The University of Western Australia

Improving diagnosis and genomic profiling in lung cancer using a novel EBUS biopsy technique

$95,728.00

Dr Kieran Mulroney

Harry Perkins Institute of Medical Research

Personalised precision pathology for bacterial and fungal bloodstream infections

$193,954.00

Dr Myles Murphy

Edith Cowan University

Harnessing 'brainpower' to reduce the burden of hip osteoarthritis

$238,852.00

THE UNIVERSITY OF WESTERN AUSTRALIA
COCKELL BEQUEST

RAINE MEDICAL RESEARCH FOUNDATION

BrightSpark FOUNDATION WESTERN AUSTRALIA
Supporting Research into Child Health

Charter Hall

Leveraging the surgical wound healing immune response to stimulate local cancer eradication

When is the best time to have cancer surgery?

Dr Rachael Zemek, a child health researcher, undertook her Raine Priming Grant at the Telethon Kids Institute which focused on optimizing immunotherapy treatment to help combat cancers including sarcoma. Her research focused on identifying the specific time-dependent events that trigger tumor-specific T cell responses following surgical resection of tumours, and the optimal timing for initiating immunotherapy to achieve the highest response in combatting cancer. T cells, integral to our immune system, play a crucial role in defending the body against infections and cancer.

The front-line treatment for many solid cancers is surgical resection. Even with intensive chemotherapy, many patients will have recurrence of their cancer. It is well established that surgery constitutes a significant immunological event; however, its specific impacts on residual cancer and its potential influence on ongoing anti-cancer treatments like immune checkpoint therapy are not well understood. Dr Zemek found that following surgery, there is a rapid, but transient inflammatory response, in conjunction with an influx of an immune cell called neutrophils into the tumour area.

Dr Zemek explained, "I have characterized, for the first time, the effect of surgery-induced wound healing on cancer cells. I devised a model of surgical resection, that mimics the patient situation of residual tumour after surgery. Analysis of tumours over a time-course post-surgery identified a short window of opportunity for immunogenic therapeutic intervention.

Astoundingly, by simply moving the day of surgery to shortly after the initiation of immune checkpoint therapy, we could drastically improve the response from 10% to 70% complete response. I therefore have compelling data that the timing of the surgery can alter the response to immunotherapy. A better understanding of these treatments and how they interact may help inform clinicians about the optimal timing of immunotherapies and combinations to improve patient outcomes. These findings will be the basis for identifying therapeutic targets to boost the local wound healing response to increase response to immune checkpoint therapy, enabling more patients, particularly those with a high chance of relapse, to benefit."

She continued, "The Raine Priming Grant allowed me to lead my own research project, turning an idea with basic proof of concept into an area of research with the potential to improve health outcomes. This was invaluable as an Early Career Researcher, which has allowed me to grow in my own field, resulting in senior author publications, an invitation to publish in Nature Reviews Cancer and invitations to speak at national conferences. I also was able to supervise 1 PhD and 3 Honours students on this project to grow as a leader. As a result, I was offered an exciting and rewarding fellowship at the Fred Hutchinson Cancer Centre in Seattle (USA) to work in the laboratory of A/Prof. Evan Newell who is a globally renowned immunologist. I was also awarded a highly competitive NHMRC investigator grant which I will commence in 2026."

Dr Rachael Zemek

(Raine/BrightSpark Fellow)

Telethon Kids Institute & The University of Western Australia

$244,360

2022-2023

Dr Virginie Lam

Curtin University

$208,060

2022-2023

Restoration of myelin genesis with dietary-derived bioactive lipids: An opportunity to improve disease outcomes in Multiple Sclerosis

A dietary pathway for improving disease outcomes for people with MS

Dr Virginie Lam is an Early Career Research Fellow based at Curtin University where she is investigating nutritional-focused and pharmacological interventions that can modulate neurovascular and cognitive function in neurodegenerative disorders. She was awarded a Raine Priming Grant to explore whether providing specific fatty acids through diet can improve disease outcomes for people with multiple sclerosis (MS).

MS is an incurable disorder of the central nervous system that features progressive loss of myelin (the brain's protective covering), which ultimately results in neurological damage. In people who have MS, the body's ability to produce and replace myelin, the fatty coating that protects nerves, is impaired. Over time, this causes permanent loss of cell function resulting in loss of motor control, cognitive dysfunction and memory loss. As myelin is mainly made up of fat (or 'lipids'), the effective production of myelin requires large quantities of lipids. Thus the primary aim of this project was to explore if the provision of specific bioactive myelin lipids, through diet, will support the process of remyelination to delay, prevent or reverse disease progression in MS, using animal models of MS.

Dr Lam's findings have revealed a potential new disease modifying treatment, that is natural, safe and well-tolerated, that supports remyelination and attenuates disease progression of multiple sclerosis. The preclinical results are being used to inform a clinical trial to study the efficacy of myelin-lipid therapy in patients exhibiting the earliest signs of demyelinating disease, such as high-risk clinically isolated syndrome or early MS.

This research may provide a new course of treatment for those suffering from MS, and has also facilitated collaborative and training opportunities with internationally recognised organisations, such as the University College London, University of Manchester, and the University of Auckland.

Dr Lam explained "The Raine Priming Grant has played a vital role in furthering my mission toward potentially finding a cure for multiple sclerosis (MS) and improving outcomes for those affected by the condition. With the funding provided, we completed a series of crucial preclinical animal experiments, and lipid profiling in blood samples collected from individuals with MS. Our findings thus far have significantly enhanced our understanding of the importance of phospholipid homeostasis in both the risk of developing and progression of MS.

Our overarching research program addresses one of the most pressing challenges in MS research, that is, identifying restorative therapies capable of restoring myelin homeostasis. The support from the grant has facilitated fruitful collaborations with leading experts in the fields of MS, neurodegeneration, and neuroimaging, both nationally and internationally. Additionally, I believe it has provided a platform to showcase the important research being conducted in Western Australia, particularly by lab-based early to mid-career researchers."

CLINICIAN RESEARCH FELLOWSHIPS

Enabling clinicians to improve health care through medical research

This program enables clinicians, nurses and allied health professionals to establish a research career while still maintaining their clinical role, seeking to broaden their impact on Western Australian health outcomes and support rapid research translation into clinical practice.

FELLOWSHIPS AWARDED IN 2023

10
Applications

5
Shortlisted

4
Successful
(40% success rate)

$1,364,976.86
Amount Awarded

Dr Bradley Macdonald

Department of General Paediatrics, Perth Children's Hospital

Echocardiographic and clinical determinants of outcome in rheumatic heart disease

$212,943.86

Dr Collin Chin

Department of Haematology, Royal Perth Hospital

Clinical applications of place-of-care manufactured CAR T-cell therapy in cancer

$440,440.00

Dr Daniel Yeoh

Department of Infectious Diseases, Perth Children's Hospital

Optimising diagnosis of pulmonary invasive fungal disease in immunocompromised children

$448,563.00

Dr Lisa Van der Lee

Department of Physiotherapy, Fiona Stanley Hospital

Breath Up

$263,030.00

Government of Western Australia
Department of Health

Western Australian Future Health Research & Innovation Fund

RAINE MEDICAL RESEARCH FOUNDATION

NIGHTOWL

Detecting obstructive sleep apnea in children

Dr Mon Ohn is a Paediatric Respiratory and Sleep Consultant Physician who serves as a Clinical Research Fellow within the Perioperative Medicine Team at the Telethon Kids Institute. Her interests focus on sleep disorders in infants and children and in particular how Obstructive Sleep Apnea (OSA) can negatively impact on surgical outcomes.

OSA is a common condition in paediatrics, and untreated OSA may have serious consequences for the child's development and health. In addition, OSA is a well-known risk factor for adverse perioperative outcomes, for example, upper airway obstruction. Enlarged adenoids and tonsils are the commonest causes of childhood OSA, along with obesity and genetic predisposition. Adenotonsillectomy (an operation to remove both the adenoids and tonsils) is the recommended first-line treatment for most patients.

The risk of significant respiratory complications following tonsillectomy in a general paediatric population is 1%, while in patients with OSA, this risk escalates to about 20%. Identifying high-risk patients preoperatively has been challenging without knowledge of OSA presence and severity. While polysomnography serves as the gold standard for OSA diagnosis, its limited availability and resource demands make it impractical for routine clinical use. There was an urgent need to establish alternative, cost-effective, and feasible measures for assessing the severity of OSA in patients, which was precisely the focus of this fellowship.

Dr Mon Ohn's fellowship focused on assessing surgery risks, particularly upper airway floppiness, which impacts breathing during surgery. Using a measure called pharyngeal closing pressure (PCLOSE), she identified its correlation with OSA in children and potential breathing complications. Dr Mon Ohn discovered that increased airway floppiness often indicates OSA, even pinpointing a specific PCLOSE value indicative of moderate-to-severe OSA. This research could help enhance pre-surgical preparations for children with OSA and result in clinical practice changes.

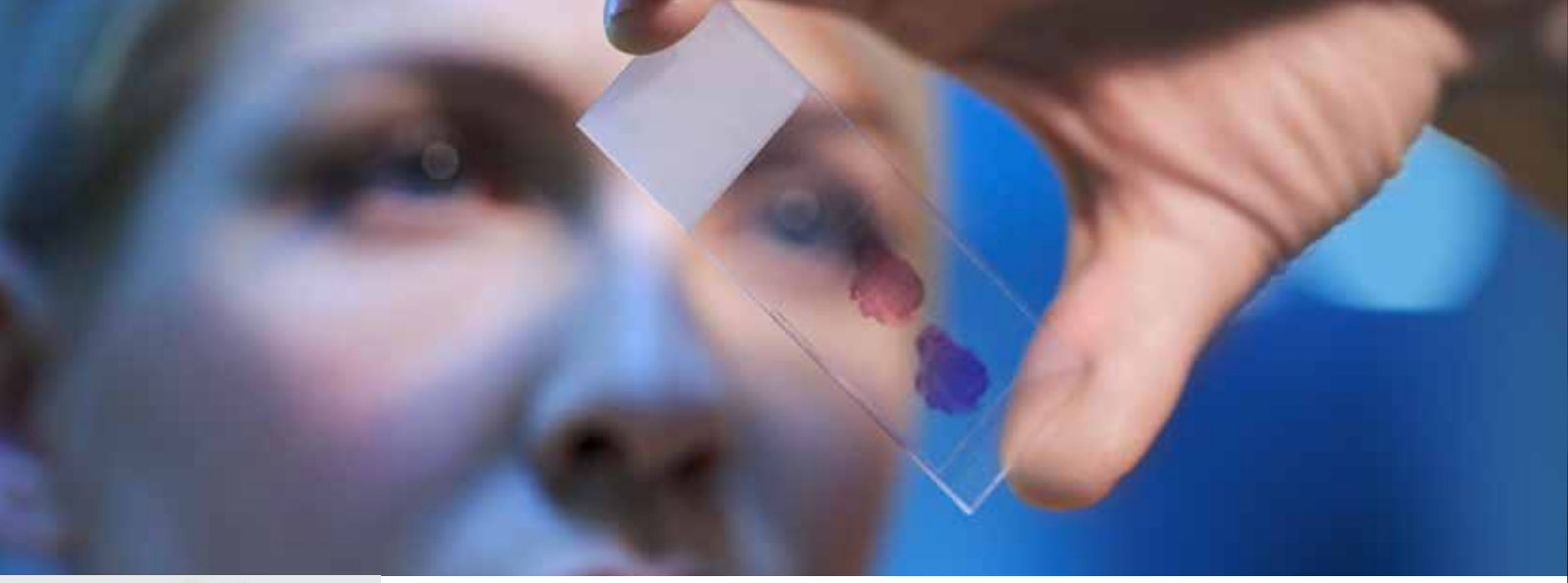
Dr Mon Ohn shared "This Raine Clinician Research Fellowship I received, with help from both the Department of Health and the Raine Medical Research Foundation, has been a game-changer. We have been diving deep into preoperative screening for OSA in children, and the findings are promising. We are talking about using new tools like wrist-worn oximetry and studying pharyngeal closing pressure to really up our game in assessing children before surgery. Without this fellowship, I don't think I could've made such an impact in understanding OSA in kids and making surgeries safer for them, especially adenotonsillectomy. And it's not just about the research–it's about changing how we care for these children right here in Western Australia. So, it's been a pretty big deal"

Dr Mon Ohn

Perth Children's Hospital

$422,315.98

2021-2023



Dr Mary Abraham

Perth Children's Hospital

$344,264

2020-2022

Hybrid closed loop system in adolescents with sub-optimal glycaemic control

Closing the loop for those with sub-optimal glycaemic control

Dr Mary Abraham is a paediatric endocrinologist and a clinical researcher based at Perth Children's Hospital / Telethon Kids Institute, leading the technology research theme in the Children's Diabetes Centre. Her Raine Fellowship examined novel methods to assist adolescents with sub-optimal glycaemic control, aiming to improve their management of diabetes and mitigate associated risks.

Individuals with Type 1 diabetes (T1D) with persistently high glucose levels are at increased risk of developing diabetes complications. This burden of chronic disease can negatively impact the individual, the family and health care system. Hence, it is vital to devise interventions to improve glycaemic control and potentially reduce the burden of chronic disease.

Automated pump therapy improves glucose levels in people with T1D. However, clinical trials have demonstrated these outcomes in individuals maintaining optimal glycemic control. Unfortunately, these trials typically exclude individuals who face challenges in managing diabetes—the very group most likely to benefit from these advancements. Therefore, the objective of this project was to utilize an automated insulin delivery (hybrid closed loop or HCL) system to improve glycaemic control for adolescents struggling with diabetes care. Dr Abraham conducted a 6-month multi-centre clinical trial, studying the effect of HCL in 46 adolescents with poor glycaemic control and comparing this with standard insulin pump therapy, which requires manual input and greater user involvement for insulin delivery compared to HCL systems.

At the end of 6-months, blood glucose was reduced in those with HCL as compared to tandard insulin pump therapy.

HCL also reduced hyperglycaemia and hypoglycaemia. Overall, an improvement in glycaemic control was noted in participants with suboptimal glycaemic control during the 6-month trial.

11 publications including 3 first authored publications were produced during the fellowship in some of the highest quality journals including JAMA Pediatrics, Pediatric Diabetes and Diabetes Technology and Therapeutics among others. The work changed clinical practice at the institution where the project was conducted establishing a clinical pathway for roll-out. This approach was also adopted across other paediatric diabetes centres in Australia.

Dr Abraham explained that, "The 3-year fellowship provided me the opportunity to have protected research time as an Early Career Researcher. This was extremely valuable as it enabled me to work on my project in a timely fashion and allowed me to seek further funding opportunities to work on future projects. Through this I was able to complete a substantial research project, including the multicentre randomized clinical trial. This body of work will help improve the scientific evidence in this field and advocate towards improving the health care of youth struggling with their diabetes care. Furthermore, the fellowship enabled me to apply for grants, commence new studies, continue and complete other existing studies. I was also able to acquire further research funding to continue my work."

RESEARCH COLLABORATION AWARDS

Connecting emerging and established research leaders across the globe

This program facilitates the development of new collaborations and projects with national and international partners, supporting skill development and knowledge transfer.

AWARDS ALLOCATED IN 2023

12
Applications

5
Successful
(41.7% success rate)*

$134,297
Amount Awarded

Dr Abdul Rahman Ihdayhid

(Healy Research Collaboration Award)

Fiona Stanley Hospital, Harry Perkins Institute of Medical Research and Curtin University with Georgia Institute of Technology, USA

Patient-Specific CT-Derived Computational Modelling to Optimise Outcomes in Aortic Stenosis

$23,420

Dr Kai Chen

(Healy Research Collaboration Award)

The University of Western Australia with Weill Cornell Medicine, USA

Advancing single-cell technologies for skeletal biology and diseases

$29,212

Dr Michale Kyron

(Cockell Research Collaboration Award)

The University of Western Australia with The University of Sheffield, UK

A Cross-Cultural Validation of an Inpatient Self-Harm Prediction Algorithm

$25,618

Dr Mahdi Mazidi Sharafabadi

(Cockell Research Collaboration Award)

The University of Western Australia with University of New South Wales, Black Dog Institute (Australia) and University of Exeter (UK) Baker Heart and Diabetes Institute

Assessment and Modification of Biased Expectancies to Predict and Optimize Emotional Wellbeing Across the Perinatal Period

$26,047

Dr Jessica Mountford

(Raine/BrightSpark/ Stan Perron Research Collaboration Award)

The University of Western Australia with Umea Centre for Molecular Medicine, Sweden

Comparing genetic variance with environmental risk factors in early-onset myopia

$30,000

RAINE MEDICAL RESEARCH FOUNDATION
HEALY MEDICAL RESEARCH FOUNDATION
BrightSpark FOUNDATION WESTERN AUSTRALIA Supporting Research into Child Health
STAN PERRON CHARITABLE FOUNDATION
THE UNIVERSITY OF WESTERN AUSTRALIA
COCKELL BEQUEST

Dr Kefyalew Alene

(Healy Research Collaboration Award)

Curtin University in collaboration with Harvard University

$30,000

2023

Optimizing interventions to reduce the global burden of post-tuberculosis sequelae

Improving outcomes for tuberculosis patients

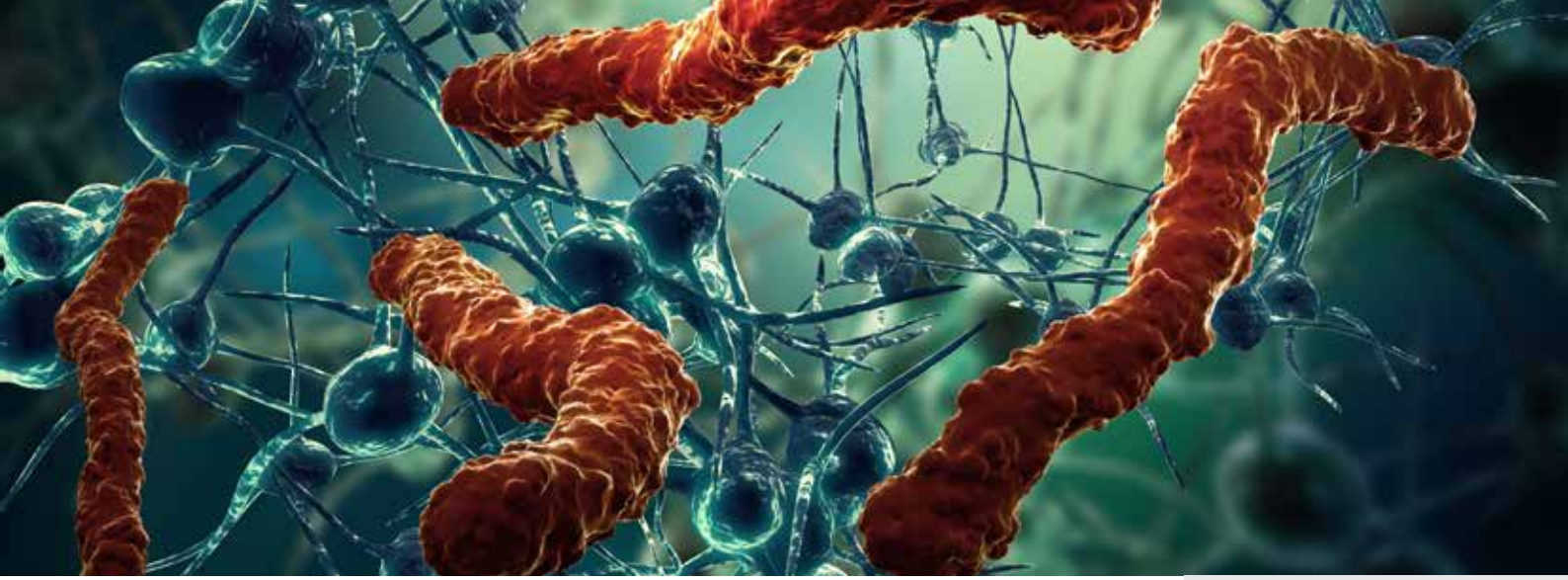
Dr Kefyalew Alene is a Senior Research Fellow with Curtin University and the Telethon Kids Institute (TKI). This award was key to Dr Alene establishing a research collaboration with Professor Megan Murray who works at Harvard University's Medical School, Department of Epidemiology. Their collaborative efforts aimed at identifying effective interventions to prevent a variety of post-tuberculosis (TB) effects on lung, liver, neurological, and mental health resulted in a publication in the highly prestigious *The Lancet eClinicalMedicine* journal titled: *Interventions to prevent post-tuberculosis sequelae: a systematic review and meta-analysis*, in early 2024.

TB remains a global public health challenge, causing substantial mortality and morbidity. While TB treatment has made significant progress, it often leaves survivors with post-TB complications, resulting in long-term health issues. The researchers on this project aimed to identify the most effective interventions which would reduce the global burden of the disease. These interventions encompass enhancing healthcare access, promoting early TB diagnosis, ensuring appropriate use of medications, monitoring adverse events and pharmacovigilance, supplementing with micronutrients, conducting therapeutic drug monitoring, and offering incentives.

A patient is deemed cured of TB when they receive a bacteriologically negative result following treatment, at which point they are discharged from the healthcare system, usually without subsequent follow-up. This model of care does not address the ongoing disability and mortality risk faced by TB survivors. The work carried out in identifying effective interventions for the prevention of post-TB effects, addressed a crucial knowledge gap in providing evidence-based strategies for post-TB care and management and showed the importance of timing of specific interventions.

The Research Collaboration Award led to Dr Alene receiving a Visiting Scientist position at Harvard Medical School where collaborative activities led to two manuscripts being produced, one of which is The Lancet paper. It also facilitated the design of future activities, including a collaborative grant proposal for the US National Institute of Health and the Australian National Health & Medical Research Council. The collaboration strengthened ties between TKI, Curtin University, and Harvard University with research findings being shared via presentations and multiple seminars. Further, a collaboratively designed longitudinal cohort study on post-TB outcomes will soon be conducted in Peru and Ethiopia.

Dr Alene explained, "While publishing in The Lancet was undoubtedly a significant milestone, the Awards impact extended far beyond that single achievement. It enabled me to establish a transformative research collaboration with Harvard University, fostering innovation and knowledge exchange at an international level. Additionally, the grant facilitated the exploration of crucial research questions, leading to valuable insights and advancements in our understanding of interventions to prevent post-tuberculosis sequelae. The award has been instrumental in not only advancing my own career but also contributing to the broader scientific community and ultimately improving tuberculosis patient outcomes."



Can inhibition of JAK-STAT signalling prevent autoimmunity and improve anti-tumour immunity?

Reducing the side-effects of cancer immunotherapy

Dr Jonathan Chee is a Research Fellow at the Centre for Respiratory Health, University of Western Australia. His team is at the forefront of testing novel therapies to improve immunotherapy efficacy in mesothelioma. Through this award and in collaboration with Professor Helen Thomas of St Vincent's Institute in Melbourne, Dr Chee's research investigated the efficacy of a pharmacological agent in mitigating the side effects of cancer immunotherapy treatment, in mouse models.

As the immune system triggers both anti-tumour and immunotherapy-induced side effects, it is important to develop strategies that will reverse side effects without compromising the anti-tumour immune response. Dr Thomas' research has shown that a clinically approved drug for treating rheumatoid arthritis successfully reversed autoimmune diabetes - a side effect of cancer immunotherapy. By gaining the necessary expertise in Dr Thomas' laboratory, Dr Chee was able to identify the optimal timing for administering this drug without compromising the immune system's tumor-fighting abilities. Dr Chee's research revealed the critical importance of administering this drug after immunotherapy treatment rather than in combination with it, as the anti-tumor effects of immunotherapy treatment remain uncompromised, but only if it is administered after treatment.

Immune checkpoint therapy (ICT) is a type of immunotherapy that has revolutionised treatment of some advanced cancers, with durable responses in a subset of patients. Despite the clinical success, ICTs can cause a spectrum of toxicities known as immune-related adverse events, including the development of type 1 diabetes. As more patients undergo ICT, there is an urgent need for novel agents that effectively prevent such side effects without impeding the anti-tumour immune response. Dr Chee's research has identified the optimal timing for the administration of these novel agents.

Thanks to this award, Dr Chee and PhD student Ms Nicola Principe visited Professor Thomas' team in Melbourne. They shared expertise in immunogenetics and analysis techniques, while ProfessorThomas' team provided training in laboratory techniques essential for type 1 diabetes research. Further, a researcher from Professor Thomas' team also visited Perth and presented their research to paediatric immunology and endocrinology specialists in WA.

This award also led to a publication in the Journal of Clinical and Translational Immunology as well as a successful US Department of Defense Career Development Award for Dr Chee.

Dr Chee explained, "This award facilitated a project that not only aims to enhance the quality of life for cancer patients by reducing therapy-related side effects but also provided a platform for learning from global leaders in this field. A rare but severe side effect of cancer immunotherapy is diabetes, which occurs when the treatment designed to boost anti-tumour immunity inadvertently leads to the destruction of the patient's insulin-producing cells. Professor Thomas recently identified a drug that counteracts this side effect in animals. Through our project, we determined the best timing to safely combine this drug with immunotherapy in animals with tumours, so that the anti-tumour effects of immunotherapy are maximised. This drug shows promise to alleviate side effects in cancer patients undergoing immunotherapy."

Dr Jonathan Chee

(Healy Research Collaboration Award)

The University of Western Australia in collaboration with St Vincent's Institute, Melbourne

$27,812

2022

PUBLICATION PRIZES

Facilitating dissemination of research knowledge

These Prizes are awarded to Early Career Researchers who have published high-quality research that has advanced their medical research field. The Prize facilitates conference attendance and collaborative research activities.

PUBLICATION PRIZES AWARDED IN 2023

3
Successful

$15,000
Amount Awarded

Dr Erin Lloyd

(Raine Research Prize)

The University of Western Australia

Slow or fast: Implications of myofibre type and associated differences for manifestation of neuromuscular disorders

Published in Acta Physiologica

$5,000

Dr Nick Si Rui Lan

(Strachan Memorial Prize)

The University of Western Australia

Evaluation of Stable Chest Pain Following Emergency Department Presentation: Impact of First-Line Cardiac CT Diagnostic Strategy In An Australian Setting

Published in Emergency Medicine Australasia

$5,000

Dr Gizachew Tessema

(Raine Brightspark Research Prize)

Curtin University

Interpregnancy interval and adverse pregnancy outcomes among pregnancies following miscarriages or induced abortions in Norway (2008–2016): A cohort study

Published in PLoS Medicine

$5,000

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BrightSpark FOUNDATION WESTERN AUSTRALIA Supporting Research into Child Health

Strachan Bequest

PUBLICATION PRIZE

The COVID-19 pandemic and healthcare systems in Africa: a scoping review of preparedness, impact and response

A review on the COVID-19 pandemic & healthcare systems in Africa

Associate Professor Gizachew Tessema co-heads the Epidemiology Research Lab at Curtin University. He was awarded the Raine Publication Prize for his publication entitled "The COVID-19 pandemic and healthcare systems in Africa: a scoping review of preparedness, impact and response", which appeared in the BMJ Global Health journal in 2021.

This important publication significantly influenced policy development and knowledge dissemination, informing the World Health Organization's position paper on strengthening health systems to promote universal health coverage and enhance health security in the Eastern Mediterranean Region.

The COVID-19 pandemic had an unprecedented impact on health, the global economy, and the global health system. The pandemic overwhelmed health systems in both high-and low-income countries and claimed more than 7 million lives. However, unlike in high-income countries, there was limited evidence exploring the level of preparedness and short-term health system implications of the pandemic in Africa.

Associate Professor Tessema's publication provided comprehensive evidence evaluating the COVID-19 pandemic effects on the African healthcare systems, encompassing the preparedness, impacts of, and response measures. The research identified three core preparedness-related bottlenecks in the region: equipment and resource constraints, capacity constraints related to testing and inadequate surge capacity to deal with increased service needs related to COVID-19. The publication also highlighted critical impacts of the pandemic including reduced service utilisation rates for essential healthcare services and missing scheduled appointments by chronic care patients. Additionally, it identified response measures such as establishing telephone consultations, re-purposing services and facilities.

Associate Professor Tessema's research into these crucial parameters have had a global impact, aiding countries in the Eastern Mediterranean Region to advance universal health coverage and ensure health security.

The prize awarded to Associate Professor Tessema allowed him to attend the 17th World Congress on Public Health (one of the largest public health conferences) in Rome, Italy in May 2023 where he presented his influential research. During the conference, aside from his national collaborators, he also met one of the past presidents of the World Federation of Public Health Associations, Dr Mengistu Asnake, whom he invited to be a plenary speaker for an annual conference hosted by the Australian-based Ethiopian Researchers Network.

Associate Professor Tessema shared, "I believe the most substantial achievements from this prize are the recognition of the quality of my work and the opportunities it has afforded me to engage in high-quality international collaborations. Beyond the recognition, the associated prize funding has also allowed me to plan and attend prestigious international conferences and strengthen my collaborations. The Raine Foundation and its partners have played an integral role in shaping my career trajectory over the past few years as an Early Career Researcher."

Dr Gizachew Tessema

(Raine Research Prize)

Curtin University

$5,000

2022

THE RAINE STUDY

The Raine Medical Research Foundation made a significant investment in 1989 by granting funds to establish the Western Australia Pregnancy Cohort Study, which later became known as "The Raine Study" in recognition of the foundational contribution from the Raine Foundation and its visionary founder, Mary Raine. 34 years on the connections remains in various ways including support of Early Career Researcher and student research presentations at the annual Raine Study Symposium.

This pioneering endeavour is a longitudinal cohort study, relying on the participation of the same group of genetically related family members recruited between 1989 and 1991 for each subsequent follow-up. The continuity of involvement from these individuals enhances the value of their data over time.

Initiated in Perth, the Raine Study recruited 2,900 pregnant women (Generation 1) between 1989 and 1991, who gave birth to 2,868 children (Generation 2), the initial focus of the study. Now in their early 30s, Generation 2 participants have participated in an impressive 19 follow-up studies, spanning from before their birth until the present, collectively contributing over 30 million pieces of genetic data. Remarkably, more than 73% of Generation 2 participants remain actively engaged in Raine Study assessments.

In addition to the original Generation 1 and Generation 2 participants, the Raine Study has expanded its scope by including 109 grandmothers (Generation 0) of the original Raine Study children, as well as more than 750 babies (Generation 3) born to the now-adult Generation 2 participants. This multi-generational approach enriches the study's insights and underscores its enduring impact on understanding health across generations.

The aim of the Raine Study is to improve lifelong health and quality of life through impactful research that examines pathways and outcomes from before birth and through life's course.

- More than 30,000 pieces of behavioural, environmental, social and phenotypic pieces of information (and >30 million pieces of genetic information) have been collected on participants over the past 34 years
- Over 700 peer reviewed journal articles have been published using Raine Study resources
- Over 750 babies, Generation 3 (Gen3), have been born to the Raine Study cohort participants (estimated to reach 1,500 babies within 10 years)

2023 Raine Medical Research Foundation Prize winners

The Raine Medical Research Foundation awarded two prizes for the most outstanding research presentations by a student / Early Career Researcher at the Raine Study Symposium held on the 26th of October 2023 at The University of Western Australia.

The prizes were awarded to:

- Dr Liz Hill (Curtin University), 'The origin and impact of developmental language disorder'; and
- Roshan Ananda (Hudson Institute of Medical Research), 'Effect of Aldosterone, Renin, and Aldosterone-to-Renin Ratio on Left Ventricular Mass Index in young adults'

HIGHLIGHTS FOR 2023

$7.6 mil was successfully secured in competitive grant and fellowship funding

68 new project applications were submitted utilising Raine Study data

65 new data access and biosample requests were submitted to the Raine Study

45 peer-reviewed papers were published, bringing the total to 749 published papers using Raine Study data since the commencement of the Raine Study

Raine Priming Grant Recipients

Publication Prize Recipients

Professor David Joyce, Dr Daniel Yeoh, Dr Amelia Scaffidi

2023 RAINE ANNUAL AWARDS CEREMONY

Each year we celebrate the achievements of our past and present awardees at our breakfast awards ceremony.

On the 4th of December 2023, we were honoured to welcome distinguished guests and alumni, to The University Club of Western Australia for this event. Dr Katrina Stratton MLA, Member for Nedlands spoke and made presentations of awards for the Clinician Research Fellowships (CRF), followed by Associate Professor Steve Mutsaers and Professor Andrew Page who presented the Raine Priming Grants (RPG) as well as the Research Collaboration Awards and Publication Prizes. Across the morning we also had the opportunity to hear about the innovative research being carried out by a number of our award recipients.

Dr Daniel Yeoh (CRF Awardee) spoke on his work to optimise the diagnosis of pulmonary invasive fungal disease in children whose immune systems were compromised, while Dr Collin Chin (CRF Awardee) shared with us his research which looked at very innovative methods and clinical applications related to the manufacture of CAR T-cell therapy solutions for cancer.

We also heard from Dr Cele Richardson (RPG Awardee) whose work looked at the relationship between sleep and mental health in youth as well as Raine Robson Fellow Dr David Preece whose work, *"Addressing the Loneliness Epidemic in Young People: Bridging Affective and Clinical Science"* addressed an increasing difficult question that society is now grappling with.

Raine Acting Director, Dr Amelia Scaffidi gave an in depth presentation talking about our notable alumni and also showing off the new logos and concept designs that will be used by the Foundation from 2024 onwards.

Research Collaboration Award Recipients

Mr Andrew Thompson, Mr Mark Westbrook, Mr Gary Hitch, Dr Amanda Cleaver, Mr Peter Walmsey

Professor Amit Chakma

Dr Katrina Stratton, MLA

Clinician Research Fellowship Recipients

Mr Jay Jay Jegathesan, Dr Amelia Scaffidi, Mr Vincent Batt, Ms Sharyn Rodger, Dr Lucy Furfaro

Mr Garry Prendiville and Ms Fiona Allan

OUR PEOPLE AND PARTNERS

Our Committees

Our Research and Advisory Committees are made up of volunteers who have generously given their time and applied their expertise to guide the activities of the Raine Medical Research Foundation. We thank our members for their generosity in ensuring that we fund the very best medical research in Western Australia. We also give thanks to our many national and international expert reviewers who are invaluable to our grant review processes and provide our emerging researcher leaders feedback which they greatly benefit from.

Our Research and Advisory committees also administer The Healy Medical Research Foundation which was established in 1970 through a generous bequest by the late Patrick Burselum and Mary Estelle Healy.

Research Committee

The Raine Medical Research Foundation and the Healy Medical Research Foundation are governed in accordance with their Deeds of Trust. This includes the composition of the Research Committee.

Professor Amit Chakma
Chair
Vice-Chancellor,
The University of Western Australia

Dr Bennie Ng
CEO, AMA(WA)
Australian Medical Association WA Branch Representative

Professor Leon Adams
Professor of Medicine
The University of Western Australia

Mr Peter Smith
Fellow of the Royal Australasian College of Surgeons

Dr Aron Chakera
Fellow of the Royal Australasian College of Physicians

Professor Dickon Hayne
Professor of Surgery
The University of Western Australia

Mr Garry Prendiville
Financial Consultant
Research Committee Nominee

Professor Valerie Verhasselt
Professor of Biochemistry
The University of Western Australia

Advisory Committees

Our Advisory Committees report to the Research Committee each year to provide recommendations for award.

FINANCE & STRATEGIC ADVISORY COMMITTEE	RAINE PRIMING GRANTS ADVISORY COMMITTEE	CLINICIAN RESEARCH FELLOWSHIPS ADVISORY COMMITTEE	AWARDS & PRIZES ADVISORY COMMITTEE
Mr Garry Prendiville (Chair)	Associate Professor Steven Mutsaers (Chair)	Ms Sharyn Rodger (Chair/DoH)	Profesor Andrew Page (Chair)
Dr Bennie Ng	Professor Elizabeth Davis	Professor Garry Allison	Dr Andrew Currie
Dr Amelia Scaffidi (Director)	Dr Evan Ingley	Mr Vincent Batt (DoH)	Associate Professor Elin Gray
Mr Peter Smith	Associate Professor Joshua Lewis	Dr Amelia Scaffidi (Director)	Professor Gerard Hoyne
	Professor Bronwyn Myers-Franchi	Professor Jeff Hamdorf	Dr Amelia Scaffidi (Director)
	Professor Shane Patman	Professor Peter McEvoy	Professor Carl Schultz
	Dr Sarah Rea	Professor Merrilee Needham	Professor Nina Tirnitz-Parker
	Dr Amelia Scaffidi (Director)	Professor Lisa Whitehead	
	Professor Valerie Verhasselt	Professor Britta Regli-von Ungern-Sternberg	

Raine Management Team

Dr Amelia Scaffidi
Director

Mr Jay Jay Jegathesan
Research Grants Manager

Dr Cristina Gamez
Senior Research Grants Officer

Providing hope and opportunity together

FINANCIAL REPORT

Raine Medical Research Foundation

Financial Summary as at 31 Dec 2023

INCOME STATEMENT

Income	2023	2022
Investment Income	5,162,708	(955,672)
Unrealised Investment Income	(15,806)	(760,946)
Donations and Bequests	50,000	21,446
Management Fees	93,120	105,000
Other Income	107,910	36,584
Total Income	5,397,932	**(1,553,588)**

Expenses		
Research Funding	1,108,273	1,566,603
Employment	351,181	319,726
Administration	81,170	77,172
Depreciation	2,865	2,924
Total Expenses	**1,543,489**	**1,966,424**
OPERATING SURPLUS / (DEFICIT)	**3,854,443**	**(3,520,012)**

Funds Under Administration		
Income	1,189,018	2,607,769
Expenditure - Research Funding	821,572	1,139,243
OPERATING SURPLUS / (DEFICIT)	**367,446**	1,468,527
TOTAL OPERATING SURPLUS / (DEFICIT)	**4,221,889**	**(2,051,485)**

INVESTMENT BALANCES

Investments	2023	2022
Corpus	35,609,589	33,657,907
Research Committee Capital	13,973,542	12,043,665
Research Committee Operations	232,424	266,022
Donations & Bequests	205,085	175,523
Total Pool Investments	**50,020,640**	**46,143,116**

Other Investments - Market Value		
24/95 Monash Avenue (Hollywood)	482,850	482,850
Dexus Property Group (DEXUS) Holdings	1,734,144	1,749,950
Dexus Property Group (DEXUS) Imputation Credit (Accrual)	-	4,411
Total Other Investment - Market Value	**2,216,994**	**2,237,211**
TOTAL ASSETS	**52,237,634**	**48,380,327**
Liabilities		
Provision for leave	88,760	47,451
TOTAL LIABILITIES	**88,760**	47,451
TOTAL NET ASSETS	**52,148,874**	**48,332,876**

OTHER FUNDS

Administered by the Raine Research Committee

The Raine Medical Research Committee also administers the Clinician Research Fellowships Program, a joint funding agreement between the Department of Health and the University (via the Raine Medical Foundation) and the management of the awards for
P B Healy and EE Cockell.

	2023	2022
Clinician Research Fellowship program	4,364,315	3,924,109
P B Healy	370,005	278,087
E E Cockell	510,236	419,914
Total Other Funds	**5,244,556**	**4,622,109**

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